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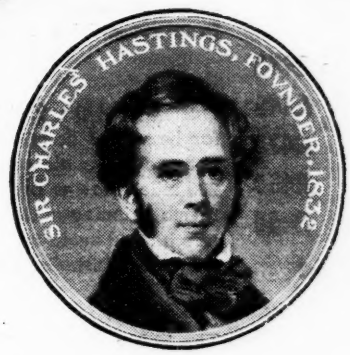

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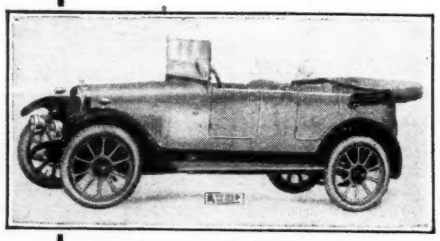

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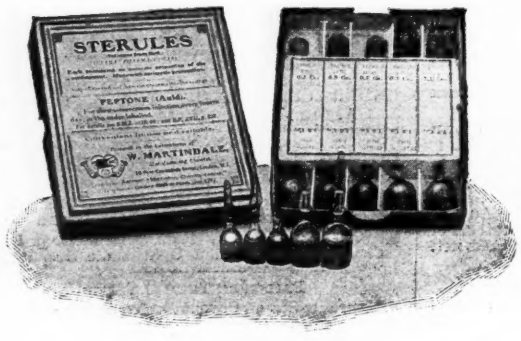

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A British Medical Association Lecture
ON
CARDIAC FAILURE.

Delivered to the North Wales Branch, July 11th, 1922,

BY

JOHN HAY, M.D., F.R.C.P.,
HONORARY PHYSICIAN, ROYAL INFIRMARY, LIVERPOOL.

In the management of patients suffering from acute fevers, from valvular disease, from persistent high blood pressure, and from progressive arterio-cardio-sclerosis, the medical man is always on the alert for the first sign of cardiac failure, for he knows that in such patients the power of the myocardium tends to fail, and must be maintained.

There is apparently an inevitable tendency for every practitioner to drift gradually into a routine line of treatment when dealing with this constantly recurring difficulty; the variable nature of the measures employed indicates a lack of any sure or solid basis for our medication. We are all creatures of habit and amenable to auto-suggestion, with the inevitable result that our critical faculties become dulled in relation to the results obtained by any routine line of treatment. As an example of this I would remind you of what is known to you all—that for many years the recognized treatment of shock was the hypodermic injection of strychnine. This practice was followed, year in, year out, by men who were satisfied that they were obtaining good results; until Crile proved that instead of strychnine being helpful and curative in such a condition it was definitely harmful and noxious. Now its use is abandoned by all competent men.

The present position in relation to cardiac failure is unsatisfactory—first, because there is a disinclination to face the necessity present in each case of determining the exact cause of the failure and adopting the treatment to meet the special need of that patient; and secondly, because there is not a clear conception as to the real value and therapeutic action of the various drugs used.

There can be no doubt that some of these drugs have a wholly fictitious reputation and yet continue to be administered with a simple and blind faith, to the mutual satisfaction of both the doctor and his patients. The doctor is not only cocksure that his treatment is right, but he is equally cocksure that whatever improvement follows is due to his interference. The teachings of tradition and a pure empiricism must yield to a more scientific attitude in the practitioner if advance is to be made.

Persistence in the use of a drug or drugs which are inert, or even really harmful, is hardly credible if one did not recognize the immense difficulty experienced in estimating the result of treatment. Human nature is more than predisposed to associate any satisfactory change in the patient with whatever method of treatment had been used immediately antecedent to that change.

When discussing such a problem as cardiac failure it seems essential to have a clear conception of what is meant by the term. An efficient heart is one which maintains a normal circulation, which supplies the muscles and viscera easily with the blood essential to their healthy functioning, and which possesses a reserve power adequate to meet the varying stresses of daily life.

We know that the demands made on the heart are greater in one man than in another, and that there is a correspondingly wide difference in the actual power of different hearts—hearts which are nevertheless healthy in themselves and adequate for the purpose of that individual. Failure begins when a heart ceases to respond adequately to the normal calls upon its reserve power, when it fails to rise to the occasion.

The Response of the Heart to Effort.

It will be helpful to review the manner in which the normal heart responds to effort, for the more clearly we grasp the essentials of the wonderful mechanism by which it meets the calls made upon it, the more easily shall we understand the significance of the early symptoms of cardiac failure and the principles underlying treatment.

The heart's main function is to furnish an adequate supply of blood to the capillary bed, to maintain the leisurely passage of oxygen-bearing corpuscles through the ultimate ramifications of the circulation. The blood has one primary duty—namely, that of acting as an oxygen carrier—and there is a direct relation between the consumption of oxygen by the tissues and the amount of work done. Physical effort at once increases the need for oxygen, and this peremptory demand of the tissues has to be met by an increased flow of blood. The response of the heart is immediate and adequate, the output of blood per minute is doubled, trebled, or even quadrupled. Instead of 3 to 5 litres a minute the output may reach 12 to 20 litres.

This marvellous response is the result of several factors, of which the chief are an increase in the rate of the heart and a more powerful and efficient systole. The very impulses which stimulate the motor area of the cortex overflow to the vagus centre and lower its tone, and thus the heart's pace quickens even before the muscular effort has begun.

A mere increase in rate would not, however, increase the output of blood per minute unless there was corresponding increase in the return of venous blood to the heart. This is brought about by the augmented respiratory movements and also by the energetic contractions of the muscles themselves, which empty the veins and drive the venous blood on towards the right auricle. This increased supply of blood to the right auricle produces a slight rise in the diastolic pressure which reflexly lowers the vagal tone, with the result that the pace of the heart is still further heightened through the accelerator nerves. Coincidently there is a definite rise in the systemic blood pressure and an increased flow of blood through the coronary arteries, which have dilated in response to the extra demands on the heart.

I have only touched on some of the more obvious changes associated with effort, but there are certain points which might be remembered, more especially in relation to the action of drugs.

An increase in rate is sometimes an indication that a weak heart is finding it difficult to supply an adequate output per minute. It indicates that the heart is attempting to counterbalance a less efficient systole by increased frequency. A more efficient systole increases the output per minute, even with an unchanged rate, provided there is a greater inflow. Dilatation of the coronary arteries, augmented by a rise in blood pressure, enables a better supply of oxygen to circulate through the myocardium.

Moderate effort in a healthy patient is not associated with any discomfort, but when excessive, two symptoms manifest themselves: (1) a tight feeling across the chest, a sensation as if it was impossible to expand the thorax; this may verge into pain; and (2) a sense of shortness of breath. Such symptoms appearing after great effort would be void of significance, but coming on after an amount of exercise which had previously been tolerated without discomfort would certainly point to a limitation of the reserve power—in other words, to early cardiac failure.

The first signs of cardiac failure are subjective; the later indications are objective and point to a serious degree of inadequacy. These earliest signs are of marked significance, for it is then that treatment may prove invaluable; discomfort going on to pain is probably of the greater importance among them, and it is this symptom which is most often misunderstood—partly because the patient's attitude towards it is misleading, and partly because it is difficult to get a clear account of his distress without a searching cross-examination.

Cardiac Pain, indicating Cardiac Failure.

A common complaint is that of "indigestion," more usually after breakfast, and this indigestion is of the nature of a "lump behind the breast-bone," either at the level of the middle or lower third of the sternum. Associated with this there is sometimes flatulence. Attempts are made to bring up wind, and finally, after a sufficiency has been swallowed, a quantity is eructated with subsequent relief. The significant feature of these subjective sensations is that they are aggravated by effort, and that the "indigestion" is eased by rest. Instead of a "lump" there may be nothing more than a tightness of the chest on moderate effort, but frequently worse after a meal or intensified by cold. Such patients yearn for the sunshine and dread the north-easterly winds.

The subjective sensations may, however, be of a different character, such as an aching pain at the angle of the left scapula or pain in the left elbow or wrist or arm. These pains in the arm or shoulder are often said to be due to neuritis or rheumatism, and their cardiac origin is overlooked; but here again further questioning reveals their relationship to effort, and it may be elicited that, if effort is persisted in, pain, definitely precordial or substernal in site, begins to manifest

itself with accompanying dyspnoea. Another symptom the significance of which is important is a sensation of weight in the arm, more often the left, unaccompanied by any definite pain; with this there is an inability to carry parcels. Such a condition is not an uncommon sequel to an attack of frank angina pectoris, but may exist in the absence of any such history. Sensations comparable to the above are almost invariably intensified by increased exertion and yield to rest, and this characteristic should be sought for when in doubt as to the meaning of such aches and pains.

It is of the greatest importance to remember that a diagnosis of "pain, cardiac in origin, and evidence of cardiac failure" must not be dismissed, as often happens, because physical examination of the heart fails to reveal any evidence of organic disease. The pain and discomfort are in themselves the evidence of the cardiac inadequacy, and fully justify such a diagnosis.

SHORTNESS OF BREATH.

This may be the first indication of a failing heart. It may be the only indication, but is often accompanied by some degree of precordial discomfort or actual pain. It is an early sign in those suffering from mitral stenosis and in patients with auricular fibrillation. Dyspnoea begins to be noticed by the patient when it is induced by a degree of effort which previously caused no distress; the limit of the reserve power is more easily reached.

The later signs of cardiac failure need only be mentioned. They are objective and indicate definite and unmistakable inadequacy. They include venous engorgement, a large distended liver, painful abdominal wall, especially in the right hypochondrium, cyanosis, oedema, ascites, progressive dilatation of the heart, and basal crepitations (hypostatic congestion).

A sign of some considerable significance is true alternation of the pulse. The pulse is regular in time, but alternates in volume and tension. The alternation may be of short duration, or it may be persistent. In rare instances this can be recognized on palpation of the radial artery, but alternation is most easily appreciated during the estimation of the blood pressure; if there are occasional premature beats it is more marked immediately after the occurrence of such a break in the rhythm. With a high blood pressure it may be observed before the subjective signs of cardiac failure have obtruded themselves on the notice of the patient, but usually some degree of cardiac dyspnoea and pain are present on any effort.

In the rapid action of paroxysmal tachycardia and auricular flutter it is a common phenomenon, and if the duration of an attack becomes prolonged it is usual for some degree of alternation to develop. Its appearance is an indication of failure of the myocardium, though it has not the same prognostic significance in patients suffering from tachycardia as in those with high blood pressure or arterio-sclerosis.

If after careful consideration of the subjective symptoms and other data it is recognized that some degree of cardiac failure is present, the question to be answered is, What is the underlying cause? There are various possibilities to be considered:

1. Myocardial inadequacy resulting from the effect of toxins, as in acute rheumatism, diphtheria, pneumonia, and influenza.
2. Myocardial damage, possibly syphilitic. Narrowing of the coronary arteries.
3. A steadily persistent rise in blood pressure.
4. In cases of valvular disease, an increase in the degree of mechanical defect.
5. Persistent increase in rate: (*a*) paroxysmal tachycardia; (*b*) rapid irregular action in auricular fibrillation.

In addition there is what may be called circulatory failure —a lack of vasomotor tone—in which the cause of the circulatory failure is vascular rather than cardiac.

TYPES OF CARDIAC FAILURE.

We have, then, certain groups or types of cardiac failure that stand out at once for recognition.

I.

Failure due to toxaemia, in which the myocardium is definitely damaged by toxins, occurs, for instance, in influenza and diphtheria. The only treatment worth considering in such a case is antitoxic, and the preservation of the heart from all strain.

In diphtheria the use of antitoxin is indicated. In pneumonia within the first three days detoxicated vaccines find a place, and if the pneumonic infection belongs to Type I then the intravenous injection of the corresponding serum is advisable; in addition, purgation and methods of keeping the skin active should be employed.

When the myocardium is damaged by an acute toxaemia the greatest care should be taken to save it from all avoidable effort and strain. The details of the nursing are all-important; anything impeding the respiratory movements of the chest and diaphragm should be dealt with at once—such as, for example, intestinal distension, which materially handicaps the heart by interfering with the normal descent of the diaphragm. A sharp pleural pain similarly limits the movements of the chest wall, and care should be taken that a pleural effusion is not overlooked. Drugs given in the hope of compelling the heart to act more efficiently are useless. For such a purpose the hypodermic injection of strychnine is futile and the value of digitalis questionable. Professors Dixon and Harvey in a suggestive paper[1] published in 1908 related some interesting experiments bearing on this point. One portion of their paper deals with the toxic effect of diphtheria, and the experiments reported justified the authors in the opinion that drugs act much less effectively on cells poisoned by toxins.

It is probable that toxins vary in their effect on the cardio-vascular system. Consequently satisfactory treatment will depend on a knowledge of the peculiar action of the toxin in any particular disease. S. Yabe[2] has recently published the results of some experimental work on the action of diphtheria toxin upon the circulation. He found that the toxin produced a lowering of the blood pressure, due neither to cardiac failure nor to direct action on the peripheral vaso-constrictory nerves, but to failure of the central vasomotor mechanism. It is unfortunate that so little experimental work dealing with the action of drugs on the circulation in acute toxic conditions has been done, but what evidence there is lends support to the view that severe toxaemia diminishes very materially the response to drugs.

II.

There are the patients in whom the cardiac inadequacy is the result of progressive degenerative changes in the myocardium or in whom the coronaries are so narrowed that the blood supply to the heart muscles is just sufficient to meet the needs of an easy and placid existence.

In such patients the essential thing in treatment is not drugs but an adaptation of the patient's life to his limitations. It is obvious that drugs can only play a small part here unless there is some hopeful element in the history, such as syphilis. Senility is ill borne by some, for the patient is not alone who said, "I don't like Annie Domini, she is so persistent."

III.

We have also the group of high tension cases in which the heart begins to show signs of failure. I have noticed that these symptoms frequently date from an attack of influenza or other infection which impaired the driving power of the myocardium and materially diminished the cardiac reserve.

Here the regulation of exercise and diet, attention to the bowels, and especially the occasional use of mercury, either as calomel or blue pill, together with the exhibition of haematinics, are of the greatest value. Such measures are of more service than the so-called cardiac tonics, though the caffeine and theobromine group appears to be helpful, and opium in some form may prove invaluable in the later stages. The iodides have established a reputation in the treatment of this type of patient and may be given a fair trial, though it is difficult to explain the manner in which they act; there is certainly no evidence that they lower the blood pressure. Frequently vaso-dilators are useful, especially in warding off attacks of cardiac pain. A tablet of erythrol tetranitrate chewed a few minutes before leaving the house in the morning may enable a patient to reach his office in comfort. It neutralizes the slight rise in pressure caused by the effort and saves the heart, but it is most doubtful whether the persistent use of these vaso-dilators has any real and lasting effect on the blood pressure.

IV.

Chronic valvular disease tends to progress and thus increase the mechanical defect, and there is also in most instances some impairment of the integrity of the myocardium. As in Type III so also here, cardiac failure may be precipitated by some passing febrile attack. There is a limit to the development of hypertrophy, and that limit is the calibre of the coronary arteries. Sooner or later, then, such patients

manifest signs of cardiac failure. A compensatory rapid action is induced by the slightest effort, accompanied by distress.

In the absence of a disorderly rhythm the treatment is primarily by rest, and an attempt to improve the quality of the blood by the administration of iron and arsenic over long periods—say for four to six months at a time.

V.

A most important group, if not *the* most, is that in which fibrillation of the auricle is responsible for the cardiac failure.

Auricular fibrillation is of common occurrence, and is characterized by a specific change in the activity of the auricular muscles. Sir James Mackenzie has recently suggested that this is the result of a loss of control on the part of the sino-auricular node and junctional tissues. The ventricles usually beat with increased rapidity; their action is disorderly, and many of the systoles fail to transmit a pulse to the wrist. This fundamental alteration in the mechanism of the heart adds materially to its difficulties, and sooner or later indications of cardiac failure show themselves. The first is usually an increased liability to shortness of breath.

The power to recognize the presence of fibrillation is of more importance from the point of view of treatment than the power to discriminate between the various forms of valvular disease. Once the existence of fibrillation is established the lines of treatment are clearly defined. It is in this group that drugs are of paramount importance, and the drugs are those of the digitalis group.

I do not propose to discuss the treatment of fibrillation in any detail, since so recently as July 22nd I dealt with the subject in the British Medical Journal, but it is necessary to refer to one or two points in the use of digitalis and its allies.

Intravenous medication is indicated when the cardiac failure is severe and the expectation of life is measured by hours—then strophanthin is the most efficacious remedy, and should be used in doses varying from 0.5 to 1 mg. Otherwise the ordinary tincture of digitalis (*B.P.*) is probably the best preparation. Nativelle's granules of digitalin 1/240 grain are also useful, and there are other standardized tinctures and extracts which have proved satisfactory.

Whatever preparation is used it should be pushed until a specific response is obtained, and the amount then reduced until the optimum dose for that individual patient is determined.

If the diagnosis of fibrillation is established, then by some means or other digitalis and its allies must be administered. Nausea and vomiting do not necessarily indicate that the drug has been given in excess; an irritable stomach must be circumvented either by greatly diluting the digitalis or strophanthus or by the simultaneous administration of a bland and soothing stomachic mixture. An intravenous injection may prove to be the only satisfactory method.

In auricular fibrillation and auricular flutter the rapid action of the heart can generally be controlled by drugs; the reverse is, however, the case in true paroxysmal tachycardia. The ventricle continues to beat at 200 or more in spite of all treatment, and gradually this great strain on the myocardium induces cardiac failure with progressive dilatation, cyanosis, and other objective signs. Drugs appear to have no influence on this type of tachycardia—neither strophanthin intravenously nor digitalis by the mouth. Opium in some form is the most valuable drug. Pain must be relieved and sleep obtained. In this way the power of the myocardium is best maintained.

VI.

It is perhaps as well to refer briefly to cardio-vascular failure, in which it is not the heart itself that is at fault, but either the terminal branches of the vessels are affected or the vagal tone becomes appreciably raised, producing slowing and a tendency to syncope.

Cardio-vascular failure is found in severe toxaemias such as diphtheria, and also in post-traumatic and post-operative shock (surgical shock). Bayliss has shown that in these patients the mass of the blood in currency is greatly diminished. There is exaemia, "an accumulation and stasis in capillary areas," with a consequent fall in blood pressure. This fall in blood pressure must be met. Bayliss demonstrated that intravenous injections of 6 per cent. gum arabic in normal saline raised the pressure at once and rapidly improved the condition of the patient.

This applies to surgical shock associated with loss of blood. Unfortunately there is not the same favourable response in patients suffering from post-operative shock in which there has been little, if any, bleeding. Adrenaline or pituitrin should be injected, and it is usual to use, in addition, intravenous injections of normal salines and to give saline enemata. Similar lines of treatment should be followed in conditions of severe toxaemia.

A sensation of faintness or actual syncope is due in part to increased vagal tone, and this is best countered by hypodermic or intravenous injections of atropine in full doses. In such patients the pulse rate falls and the volume of the pulse is diminished; in fact, in some instances it may cease to be palpable at the wrist. There is a fall in blood pressure of a degree not to be explained by vagal action alone.

Such faints are not an indication of either heart disease or even of primary cardiac failure; they are reflex, and are probably a combination of undue vagal slowing and a lowering of vasomotor tone.

Drugs.

In *cardiac failure* drugs, etc., may be used:

(1) To influence the nervous system (opium, chloral, bromides);
(2) To improve the quality of the blood by increasing its haemoglobin content;
(3) To neutralize toxins;
(4) To stimulate the myocardium to more vigorous contraction;
(5) To depress the junctional tissues and slow the ventricular rate;
(6) To raise the blood pressure.

Before concluding I propose to discuss in a little more detail some of the drugs more commonly administered as cardiac stimulants or toxins.

Strychnine.—I have already referred to the uselessness of strychnine in cases of shock, but there can be no doubt as to the widespread faith in its action as a direct cardiac stimulant. There is little satisfactory evidence that strychnine given in the doses usually employed has any action at all on the circulation. Drs. Parkinson and Rowlands carried out a careful series of observations of 50 patients, and their considered opinion is as follows:

"We found no evidence that the subcutaneous injection of a full dose of strychnine in cases of heart failure with a regular rhythm produced any change in the blood pressure, rate of pulse, rate of respiration, or general symptoms, within an hour following its administration. In cases of auricular fibrillation strychnine produced no change in the rate or the irregularity of the pulse, rate of respiration, or general symptoms during the same period. We conclude that strychnine has no effect which justifies its employment as a rapid cardiac stimulant in cases of heart failure."[3]

Strychnine may and probably does produce an effect in the respiratory centre, but even this is only slight and uncertain. It may serve as a valuable ingredient in a tonic mixture or a laxative pill, but to rely on it in the advent of cardiac failure is futile. While strychnine has a wide and unwarranted reputation as a cardiac stimulant in Great Britain, it is largely neglected on the Continent. In Germany camphor appears to take its place, and is usually given dissolved in oil and injected into the muscles. There is, however, no convincing evidence that it is of any more value than strychnine, and it is questionable whether the cardiac power is modified by its use.

Alcohol.—Another drug which still has a great vogue as a cardiac stimulant is alcohol, more especially in cases of threatened cardiac failure, in such fevers as pneumonia and typhoid. Here, again, all the evidence is clearly and decisively against its use in such conditions, when given with the object of strengthening or stimulating the heart. It may justifiably be administered in order to induce sleep, and is a valuable ally when used for this purpose,

"but no scientific ground has been discovered for any claim made on behalf of alcohol to practical value as a direct stimulant of the heart in cases of threatened failure of the heart."

This last statement is quoted from the most recent authoritative pronouncement on the action of alcohol. Its action is mildly narcotic and sedative, and induces a comfortable feeling of *bien-être*, "a careless sense of well-being." This may be of value in the management of a cardiac patient, but does not justify its exhibition when a cardiac stimulant is indicated. I do not of course forget the transient stimulation of the heart, accompanied by some acceleration of the beat which immediately follows the swallowing of a mouthful of spirits. This is a response due to its irritant action on the mouth, throat,

and stomach, and occurs before the alcohol has been absorbed—before, therefore, it has begun to exert its specific action. This local action is of value in attacks of faintness and in the severe pain of the anginal type.

Caffeine Group.—In this we find drugs which produce a definite action on the efficiency of the cardiac systole. At the last (Oxford) meeting of the Association of British Physicians, Professor Gunn gave a demonstration of the action of drugs on the perfused heart, and the effect of caffeine was remarkable. The ventricular rate was increased, and with it the completeness of the systole. Of this group caffeine is the most commonly prescribed. Unfortunately its action on the brain sometimes prevents large doses being administered because of the resulting insomnia and palpitation. When used in pneumonia I think it is best to give it only in the morning and afternoon, and withhold it in the evening and through the night on account of its tendency to make the patient restless and sleepless. Caffeine is often prescribed in combination with a scale preparation of iron in cases of hypertension, and appears to be of service when taken for a long period. The theobromine preparations are especially useful in cases of cardiac failure where oedema has developed; their diuretic action is rapidly produced and may be of great value. The most potent is theophyllin acetate or theocin given in doses of 5 grains in a hot drink such as tea, and administered while the patient is taking digitalis. Its action is rapid and may cause diuresis even before the digitalis has had time to act. Experimental work tends to show that in addition to the diuresis the heart itself is stimulated and the coronaries dilated. This in itself would materially strengthen the heart. Unfortunately theocin is often badly tolerated, and in some patients causes nausea, vomiting, and headache. Another drug frequently prescribed is diuretin. It is better tolerated than theocin, and its action appears to be on similar lines. The dose is much larger and is 30 to 60 grains daily. Theobromine has for a long time been recommended to relieve anginal pain, and for some years I have used diuretin for this purpose. My experience certainly supports the view that the liability to anginal pain is diminished by this drug.

Adrenaline has a rapid and remarkable effect on the cardiac output, and simultaneously on the blood pressure, but its action is transitory. Some of its beneficial action on the heart is probably due to the combination of a rise in blood pressure and a ditatation of the coronaries, thereby increasing the blood supply to the heart muscle.

CONCLUSIONS.

I am afraid that as a profession we are too credulous as to the value of the majority of the so-called "cardiac tonics." The position of digitalis and its allies is of course unassailable, but their action must be fully understood if we are to obtain the best results; and their administration must not be half-hearted—the drug must be pushed to the full legitimate limit. When cardiac failure is consequent on fibrillation of the auricle, digitalis gives its dramatic results—but the sphere of its usefulness is not entirely confined to this group.

It is open to serious question whether strychnine and alcohol have any direct stimulating effect on the heart, and camphor falls into the same category.

The caffeine group, including theobromine and its compounds, has undoubtedly an influence on the heart and circulation which may be of service under certain conditions, especially when the failure is associated with oedema.

It is just as well to face the fact that we have very few drugs which can be relied upon to act as specific cardiac stimulants, and even those with an assured position only act satisfactorily in the absence of severe toxaemia.

The less we rely on "cardiac tonics" the more attention shall we give to those features in the management of the patient by which the heart can be saved from strain; the more shall we attempt to delay cardiac failure in the acute infections by dealing directly with the toxaemia; and the more shall we make every effort to maintain the quality of the blood at a high level in chronic valvular disease and thus supply the heart with an adequate blood stream.

In treating cardiac failure I would urge that the discussion of the particular cardiac tonic to be administered should come last and not first, and that certain other lines of attack should receive full consideration. It is of primary importance to diminish the number of beats. Physical rest and freedom from excitement and worry will do this. At the same time there are many patients suffering from valvular disease and other forms of cardiac disability whose reserve power can be immensely improved by exercise, and to increase the reserve power is to diminish the liability to cardiac failure.

Hearts, like individuals, soon get "out of order," and the habit of rigidly restricting the amount of effort and exercise for no better reason than the existence of a murmur is to induce with certainty a condition of diminished reserve power. The symptoms of distress in such patients are not the result of the disease, but of the treatment. To make matters worse, many of these unfortunates become introspective and apprehensive about themselves; their outlook on life is altered, and they deny themselves all reasonable exercise for fear of straining their hearts or of inviting a sudden death.

Serious attempts must be made to give these neuropaths more confidence in their powers. For such dancing is an excellent form of exercise, and is being largely employed in America. Most people enjoy it; the periods of actual dancing are short, the exercise is intermittent, and the degree of physical effort is small. It is difficult to overestimate the value of the delight in the dancing itself as a form of mental therapy.

Exercise accompanied by enjoyment is of far more value than specified active or passive movements according to time table, though it is obvious that the latter can be more carefully graded. There are many occasions in the more severe degrees of cardiac failure where treatment of this kind is valuable, but as a general rule exercise should be a joyful performance if the maximum benefit is to be obtained. The inclinations of the patients must be considered, and the opportunities presenting themselves will in any particular case enable a pleasant and appropriate scheme of recreation to be drawn up.

Anything interfering with the freedom of the respiratory movements must be remedied. Especially is this so in cases of pneumonia, when so much depends on a free excursion of the diaphragm; abdominal distension must be dealt with drastically. In non-febrile cases a hydrothorax must be looked for and paracentesis carried out if required.

Then sleep is essential, and I think it is difficult to overestimate the great value of opium in the severer degrees of cardiac distress, and of the hypnotics such as the bromides and chloral and chloralamid in the milder manifestations. We must not forget that the "foster-nurse of Nature is repose."

The vigour of the myocardium can only be maintained when the blood supply through the coronaries is ample and of good quality. Hence the optimum blood pressure must be maintained even if it be relatively high.

The soundest treatment of all for many patients is the prolonged administration of haematinics. There is no better cardiac tonic to those suffering from valvular disease of the heart or chronic renal disease with arterio-sclerosis than a liberal supply of first-class blood to the failing myocardium.

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MEDITERRANEAN OR UNDULANT FEVER.*

BY

SURGEON REAR-ADMIRAL SIR P. W. BASSETT-SMITH, K.C.B., R.N.(RET.), F.R.C.P.

WHEN in 1900 I first went to the Royal Naval Hospital at Haslar attention in the navy was generally focused on the so-called Malta fever. My wards were full of it and remained so for six years. Since then it has always appealed to me, and I have had the opportunity of studying it in its varying forms from both clinical and laboratory standpoints for over twenty years. Happily it is now very rare in the service.

Historically it was first recognized by Marston during the Crimean war, and it was with difficulty differentiated from enteric fever. In 1886 Bruce isolated the infecting organism, which was called *M. melitensis*, as the disease was believed to be limited more or less to the island of Malta. I would here urge that the geographical names, "Malta," "Mediterranean," and "Rock" fever, etc., be dropped and the term "undulant," which describes one of the chief characteristics, be used. This was introduced by Hughes in his valuable monograph, for the disease is so world-wide that the name

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"Malta fever" for it is almost as misleading as the term "Oriental sore" for a condition found in South America.

Undoubtedly one of the most important endemic centres was Malta, for the source of infection was abundant, and the presence of a constant supply of non-immune men was provided by the changing naval and military forces, and the hospitals were hotbeds of the disease. The fever frequently developed there in patients suffering from other diseases, such as typhoid, or even surgical affections. No wonder, therefore, that as a nation we were interested in the discovery of the cause which annually gave rise to such a high amount of invaliding from the station and so many days' sickness among the fighting forces, and in the methods of prevention.

Geographical Distribution.

We now know that the fever is widely spread all around the Mediterranean littoral—in Spain, France, Italy, Greece, the Levant, Egypt, Tripoli, Tunis, Algeria, and most of the islands. During the past few years its introduction to districts far from the sea has been shown in Spain, Portugal, and France. This is a most important etiological factor. Leaving the Mediterranean, endemic centres are found at Suakim, Aden, and India, especially in the Punjab, in China, in the Yang-tse valley, and Craig has reported it from the Philippines. In tropical Africa it is found in the Soudan, by the Blue Nile, in Northern Nigeria, and in Uganda. After the Boer war it became prevalent in South Africa, in the Transvaal and Orange River Colony—that is, when the cattle were few and more goat's milk was used. In America there appears to be a true endemic centre in Texas extending to New Mexico, and cases have been described from Peru; so you see the term "Mediterranean or Malta fever" is greatly misleading.

It was not until after the institution of the Royal Society's Commission, under Sir David Bruce, which had been working for two years and gave its final report in 1906, that the usual source of the infection was traced to the milk of the native goats, which animals appeared to be perfectly healthy at the time, though passing out enormous quantities of the infecting organisms in their milk. From these investigations, which led to the compulsory sterilization of all fresh milk used in the services or the employment of condensed milk, the disease was practically abolished and an enormous saving of money, time, and distress was brought about. No modern scientific preventive work has been more successful or of greater use to humanity. I should like to quote some words of Professor Zammit on this point:

> "Before 1905 few of the employees of the Electric Telegraph Company, dockyards, etc., or their families escaped infection, but it is now exceptional for a foreign resident, who takes the necessary precautions, to fall a victim to undulant fever. The bulk of the Maltese population thought that they knew better, and have not heeded the caution repeatedly given by their sanitary officers of the danger of using unboiled milk, with the result that there has been hardly any decrease among them of the number of cases of undulant fever."

About 5 per cent. of the goats are still infected, which is a dangerous number, as a single goat may infect hundreds of persons. The attempt to limit the disease by educating the people has been a failure, so that the only prophylactic measure applicable is the destruction of all infected animals. This statement applies also to most other areas where natives have to be dealt with. Zammit also says that a goat once infected never recovers, the organism being always found in its organs, and an infected goat, apparently healthy, will, after kidding, always pass out infected milk.

The disease is seen to be mostly subtropical in distribution, and wherever it occurs endemically goats in herds are practically always present, and although the Maltese goat, which has been widely exported on account of its good milking value, is the most frequent offender, yet any goats are susceptible of infection, and from them it may spread to other animals—cows, mules, horses, dogs, and man.

Mode of Infection.

A very interesting account of the method of infection is given by Léger.

> When the goats from the hills in Corsica are brought down to the towns many of the women who milk them become infected through the hands by the *M. melitensis* in the milk. The women rarely or never drink the milk. This milk is afterwards converted into fresh cheese, so commonly used in these areas, which itself is also a source of human infection, and more particularly so as the vendors often bathe the cheese in fresh milk to improve its appearance. In pasture one infected goat may infect healthy herds when introduced among them, and these may infect the dogs and goatmen. In Spain and France the same thing occurs. Though the ingestion of the milk is the most common source of infection, the products of the milk, such as cheese and ice-creams, are dangerous.

I have mentioned how the organism may be directly inoculated through abrasions of the skin, and Séjournant goes as far as to say that, though in towns the usual source of infection is by drinking the contaminated milk, in the rural districts it is mostly caused by a local infection or inoculation of infected milk or soil. The fact that the organism is passed out of the body by the urine and faeces should make us look upon all cases as potentially infective, which necessitates the disinfection of all excreta, etc., and warning the nurses accordingly.

The specific organism is the *M. melitensis*, which, as described by Bruce, is a minute coccus or coccus-bacillus about 0.3 μ in diameter. It is, in old cultures, very pleomorphic, and is described by American authors as a bacterium, and is closely allied to the organism which causes abortion in cattle, morphologically, serologically, and tinctorially, a definite group being formed called "Brucella." The exact relationship of the two has not yet been definitely ascertained, but the latest experiments show that the *abortus* organism is very common in cattle and is very infective, that specific *melitensis* serum agglutinates it to a high titre, and that the pathological lesions and symptoms produced are very similar to those found in undulant fever, but its infectivity is extraordinarily slight as compared with that of *M. melitensis*, and if it is a variety of the latter it is one of very low virulence. In the group we have various strains of *M. melitensis*, the *M. para-melitensis*, and the *B. abortus*. I have found that the serum of acute cases of undulant fever agglutinates the *melitensis* and *abortus* strains about equally, but the *para-melitensis* to a much lower titre. The occurrence of cow's milk in England containing agglutinin for the *melitensis* organism is thus explained, and the absence of undulant fever caused by this milk in this country. At Greenwich I found quite a large percentage of cow's milk gave positive reactions.

Clinical Features.

Naturally infected the incubation period is about fourteen days, but by laboratory infection it may be as short as six days (as in my own case). Here I would like to emphasize the importance of using the utmost care in the laboratory when working with this organism, and there have been so many accidental inoculations that it may be looked upon as one of the most dangerous to handle. Very often there is a long period before the onset of the disease, cases developing after leaving the endemic area. I have records of many definite cases who remained quite well while in the Mediterranean, but developed the acute disease after arriving in England.

The disease may last from two weeks to two years; the average period of 552 cases was four months. The mortality varies from 2 to 6 per cent., or rather higher in children, but from late experience it would appear that after 40 the prognosis as to life is considerably less good than in young adult age.

Four Types.

Four types may be described.

1. Ambulant—namely, those who have no symptoms but who are passing out the organism in the urine. These cases were first described by Shaw from among dockyard labourers at Malta. They are all potentially active sources of infection.
2. Mild case lasting about fourteen days, often mistaken for paratyphoid, etc., in whom there is no relapse.
3. The ordinary or undulant type of greater or less severity.
4. The malignant type, where early hyperpyrexia and intense toxaemia occur, and a fatal issue is usual. These cases are, fortunately, very rare.

A form with a hectic, intermittent type of temperature was described by Hughes; this is, I believe, only the termination of the ordinary undulant form, but being associated with cough, sweats, and general wasting, it was often called Mediterranean phthisis, but the physical signs, nummular sputum, and tubercle bacilli in the sputum are absent. These cases may last for months, and they appear to be common in South Africa. Strachan remarks how difficult they are to diagnose, especially if the temperature is only taken in the morning, when they are often entirely missed.

General Symptoms.

In an ordinary case, after a period of malaise, with headache, loss of appetite, and disinclination for work, the temperature fairly quickly runs up to 103° or more. The high fever may be continuous, but generally there is a marked fall in the morning. Slight shivers are common but rigors are rarely noticed. The tongue is moist and thickly coated, the fauces often congested; gastric symptoms may be present with vomiting and irregular diarrhoea, the stools being offensive and bilious. Frequently constipation is present from the first. The headache is severe and frontal in character and

there are sleeplessness and mental irritability. Tenderness over the spleen is generally found, and both this and the liver will be slightly enlarged. If the fever continue high a typhoid condition is produced; the tongue becomes dry and cracked, small and pointed; nervous prostration is marked with muttering delirium, or there may be drowsiness passing into stupor; the pulse gets small, rapid, and intermittent, and is markedly dicrotic, and secondary pneumonia or heart failure may carry the patient off. Most commonly there are marked waves of remittent fever of varying length and intensity, separated from one another by periods of temporary absence of symptoms.

As a rule the temperature gradually rises, remitting every morning; after a short time the lassitude and debility increase, the general condition rapidly deteriorates, epistaxis is common, sweats are profuse and occasionally petechiae are found, and insomnia becomes more marked. The primary wave may last from ten days to six weeks, when improvement commences and the temperature falls to normal, or nearly so, but within a few days a relapse occurs. The symptoms of this are very similar to those of the first attack but perhaps less severe; constipation becomes more marked, the spleen and liver are more enlarged and tender, anaemia becomes more pronounced, the sweats are more profuse and distressing, and neuritis tends to appear. Each wave of temperature lasts about a fortnight, and these typically get shorter and less marked at each recurrence, but, after each wave, depression and loss of flesh increase, with the occurrence of neuritis, swollen and painful joints, and, rarely, orchitis. As the patient becomes more and more emaciated and prostrated he is subject to bronchitis, cardiac palpitations, and increased rheumatic-like pains, the hair falls out or turns grey, and the patient ages remarkably. The duration of the attack is about four months, and complete convalescence is slow.

As the disease is due to a general *melitensis* septicaemia, as the organism produces both exotoxins and endotoxins, its effects are very widespread. In some cases there are localized and cold abscesses, or areas of local necrosis are found without true formation of pus—at least, only the *M. melitensis* is found. In other cases which have run a long course the evidence of toxic infection is found in the organs, as shown by hypertrophic fibrosis of the liver and spleen with often a small-celled infiltration, or the kidney may show parenchymatous degenerations with haemorrhagic infiltration. Clinically the evidence of the toxin is shown by the pronounced insomnia, headache, backache, shifting pains in the limbs in the early stages, and later by the repeated attacks of neuralgia. Sometimes there is partial paralysis of groups of muscles which is not permanent, but I had one case which went on to complete paraplegia. The pains often alternate in intensity with the amount of the pyrexia; when the pains are severe the patient may be completely helpless, and intense hyperaesthesia of the feet may increase the discomfort. I have recently had a case which in the third month developed acute herpes, affecting the fourth and fifth lumbar nerve ganglia. The tachycardia, bradycardia, and palpitations are also of toxic origin. Cristina and Maggiore state that in young children the nervous system appears to be particularly affected by the toxin which causes meningitis and encephalitis. Deafness and loss of memory are transient symptoms. Lafont has drawn attention to the influence of the disease on pregnant women. Abortion and premature labour are favoured, particularly during periods of high fever, and he states that the infection can pass through the placenta. This is specially interesting in relation to the close analogy of the organism with *B. abortus* of cattle. The action of the toxin on the mammary gland is important, for the milk is found to be infected with the *M. melitensis*, and after a few days dries up, and a mastitis is often produced.

Para-melitensis Infection.

I have had four cases of *para-melitensis* infection—two males and two females.

The first was a lady who contracted the disease at Hyères, on the Riviera. The course of the fever was very prolonged, having very irregular intervals, and was associated with great debility, anaemia, and constipation, also severe neuritis and arthritis. After the disease had lasted many months I found that it was a true *para-melitensis* infection, and the patient was treated with *para-melitensis* vaccine for several months, making a perfect recovery from a state of great misery.

The second case was that of an old gentleman, aged 70, from the south of France. His condition was so severe that I did not recommend vaccine treatment. The patient died, and at the *post-mortem* examination a secondary streptococcic infection was found with infarcts in the spleen.

The third case was in my ward at the Dreadnought Hospital. The fever was contracted at one of the ports in the Adriatic, and he was practically convalescent when admitted, but the blood agglutinated to 1 in 2,000 with *M. para-melitensis* and 1 in 200 with *M. melitensis*.

The fourth, a fatal case, was that of an old lady who contracted the disease at Dax in the south of France. She had suffered from irregular fever for months, was greatly debilitated, and had also endocardial lesions. Vaccine treatment was used, but each injection produced marked local and general reaction, and an intense purpura followed and evidence of nephritis. The vaccine when tested was sterile and when inoculated into guinea-pigs caused no ill effects.

The reaction, therefore, seems to have been due to a definitely lowered resistance to the small amount of antigen introduced. Florintini states that the *melitensis* organism produces a toxin which acts as a haemolysin. In my last case a purpuric rash also occurred with each wave of fever; this is a serious symptom. In guinea-pigs inoculated with the two organisms cross agglutinins are produced, but the curves run more parallel with the *para-melitensis* infections than with the *melitensis*.

Diagnosis.

Clinically this is often most difficult, and a great majority of the cases have been at first treated with quinine. In mild cases a diagnosis of paratyphoid is often made; in others typhoid; in others with rheumatic-like pains and swollen joints, rheumatic fever; chronic cases with much anaemia, a hectic temperature, and cough, as phthisis; and frequently pyogenic infections are mistaken. Laboratory methods alone will clear up the diagnosis.

Haemoculture.—The organism is generally not found in periods of apyrexia or late in the disease, unless in an acute relapse. Splenic puncture is rarely justifiable. The organism is, however, generally present in the articular affections, and Burnet was able to demonstrate the *M. melitensis* from the joints of infected guinea-pigs in ten out of twelve tests. From so-called cold abscesses and chondro-chondral swellings the infecting organism is the *M. melitensis* and not *S. pyogenes*. A considerable quantity of blood should be removed and mixed with nutrient broth, 5 to 100 c.cm., and subcultured daily. Sometimes it may be recovered from the washed clot by Tizzoni's method. Agglutination with due precautions will give trustworthy results, but the emulsions must be made from reliable strains; it is wise to put up with both heated and unheated serum. Several dilutions should be employed—1 in 40, 1 in 100, 1 in 400—so as to eliminate paradoxal reactions, and always a control of normal serum and specific serum should be made at the same time. It must, however, be remembered that in chronic cachectic cases the titre of agglutination may be very low or even absent, though in acute ones it usually runs very high, 1 in 1,000 to 1 in 10,000.

Isolation from the Urine.—This when positive is conclusive, but the organism is only intermittently present in the urine, so as a diagnostic method it is not of much value.

Complement fixation and precipitation tests are also specific.

I have not been convinced of the value, as a diagnostic sign, of the statement that the highest temperature tends to be early in the afternoon rather than from 6 to 10 p.m. The possibility of *para-melitensis* infections must be remembered and the appropriate organism used for the test. The blood picture will often give assistance, for in undulant fever there is a relative decrease in polymorphs and an increase in lymphocytes, so differing from that seen in pyogenic infection.

Prognosis.

The prognosis for life is generally good as the mortality is low—2 to 6 per cent.—but recent research has shown that in young children, in Italy especially, it may be much higher, and after the age of 40 at home it would seem that, probably through lowered resistance, death from secondary infections is far from uncommon. It is never wise to make a prognosis for the duration of the disease, but with a period of ten days free from fever, with a clean tongue and normal pulse, convalescence may be expected. If the fever has lasted two months and profound blood changes have been set up then the disease may drag on for an indefinite time, with irregular attacks of pyrexia, painful neuritis, and general debility.

Treatment.

Every case should be looked upon as potentially infective, and the same care be taken as in a case of typhoid fever, warning the nurses accordingly. General good nursing is essential, and as the disease tends to run such a long course everything must be done to maintain the strength of the patient by giving as much food as he can assimilate. Alcohol should be held in reserve, so as to be of most use when myocardial signs have become marked. In the late cachectic stages stimulants are generally advantageous together with

food. The temperature should be kept, if possible, below the 103° line by cold sponging, or, if hyperpyrexial, by the wet pack, care being taken to give a stimulant if necessary. Sweats should not be shortened. A continued type of temperature shows a high degree of toxaemia or the presence of probable pulmonary complication. Arthritis should be treated with belladonna or opium applications, and the neuritis by mild hypnotics, such as sulphonal, trional, or paraldehyde; a patient should never be allowed to pass sleepless nights. If the pain is very acute morphine must be given, but should be avoided if possible.

Drugs.—These are of very little use. Quinine, camphor, methylblue, collargol, and electrargol have given some satisfactory results lately when administered intravenously. Piazzo's phenololipoid N is recommended—1 c.cm. of a 10 per cent. solution in oil given subcutaneously for an average of eight days was able to cure guinea-pigs which had received lethal doses of *M. melitensis*. It is antitoxic and bactericidal. Burney Yeo's mixture was useful. Digitalis, strychnine, and stimulants, as required by symptoms, must be given.

Serums.—Donzello and Trambusti had a nucleo-protein serum, and lately Nègre and Sergent have prepared a polyvalent serum which has given good results.

Vaccine Treatment.

The great majority of workers, English and foreign, agree that vaccine treatment is the most essential factor in the treatment of undulant fever, and should be continued until the patient is immunized. With this I agree, with the following reservation: that we should not give vaccine when, in very acute conditions, the patient is already overdosed with autogenous toxins; the ideal is a combination of an antitoxic serum and an autogenous vaccine, as the organism gives rise to so much toxin and remains alive for so long in the tissues. Burnet has shown that, when absent from the blood and urine in infected animals, the *M. melitensis* can always be demonstrated in the marrow of the long bones. Therefore always combine with vaccine treatment the administration of yeast or some other preparation to increase the phagocytic activity of the blood.

THE ANAESTHETIZATION OF PATIENTS FOR THE CLASSICAL CAESAREAN SECTION.*

BY

HERBERT R. SPENCER, M.D., B.S., F.R.C.P.,

OBSTETRIC PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL.

CAESAREAN section has a special interest for anaesthetists and obstetricians from the fact that the welfare and life of two or more individuals are involved.

On the obstetrical indications for the operation I will say nothing on this occasion except that they are being extended too widely by many practitioners.

On the anaesthetic aspect it requires some courage for an obstetrician to speak before an audience of specialists in anaesthetics, and my courage might have failed me had I not been convinced by an experience of thirty-five years of the value and harmlessness to mother and child of small quantities of chloroform given *à la reine* to mitigate the pains of labour, while insisting on the necessity of anaesthetization by an expert anaesthetist whenever an operation is required.

Perhaps I may claim a little indulgence for having broken a lance in behalf of your specialty at the Centenary of Ovariotomy meeting of the American Gynecological Society at New York in 1909, on which occasion, in a discussion on anaesthesia,[1] I expressed my amazement at finding that American patients were anaesthetized by nurses instead of specially qualified medical practitioners. My criticism was well received by my American colleagues; but Dr. Clarence Webster of Chicago (formerly of Edinburgh) was so affected by my accurate description of the position of anaesthetists in London that he informed the meeting that Scotland was the most important part of the United Kingdom, that in 1896 there was only one paid anaesthetist in Edinburgh, and that patients were generally anaesthetized there by medical students.

In this communication it is to be understood that the anaesthetic is to be administered by specially trained qualified medical practitioners.

Of the two chief methods of anaesthetizing a patient the inhalation methods are generally preferable in cases of Caesarean section. Spinal anaesthesia is undoubtedly more dangerous than inhalation anaesthesia and has drawbacks from which the latter is free. Infiltration anaesthesia has advantages, particularly in patients with pulmonary or cardiac affections. I used it successfully twenty-two years ago[2] in Caesarean section repeated for the third time. But I have not employed it since.

Spinal anaesthesia and infiltration anaesthesia are less humane than inhalation methods, which induce complete loss of consciousness; and, although they are useful in certain conditions, they are not advisable as a routine method, which it is the object of this short communication to advocate.

Of the two chief inhalation anaesthetics, chloroform and ether, I suppose no anaesthetist will assert that chloroform is as safe as ether, when administered to the surgical degree for long periods, especially to pregnant women. It has therefore largely been given up in favour of ether administered either by the "open" or "closed" method.

Ether Asphyxia of the Infant.

The great disadvantage of ether is that it leads to asphyxia of the infant, which is not the case with chloroform administered to the minimal surgical degree. In my early days of performing Caesarean section I had ether administered—of course by skilled anaesthetists—but found that the child was often asphyxiated, and that hot and cold baths, stimulants, and assistants were required to start respiration in the infant. The occurrence of asphyxia in the child is still common in the practice of many obstetricians. Dr. Hubert Roberts has pointed out its fairly constant occurrence. For many years I have used the method about to be described and can assert that the Caesarean child has never been asphyxiated by the anaesthetic thus administered.

The Method Employed.

No preliminary hypodermic injection is given. The patient, prepared for operation, is placed in the recumbent posture on the operating table in the theatre and the anaesthetic is administered there. Operator and assistants are prepared and the towels adjusted.

Chloroform is then administered by the anaesthetist, who informs the operator when the patient is ready. The operation is then rapidly performed and the child, usually delivered within thirty or forty seconds from the commencement of the incision, always breathes and cries at once.

Ether is then administered for the rest of the operation, usually by the open method.

If there is any unusual loss of blood a hypodermic injection of pituitrin is given.

The result of this method of administration is that in all cases in which the classical Caesarean section is done before or soon after the onset of labour the child is born free from asphyxia and cries at once.

I think it is the ideal method of administration; but I am anxious to have the opinion of members of the Section upon this point: Does the mother run any appreciable risk in having the operation performed while under chloroform administered by an expert anaesthetist? I think she does not, having particularly in mind the tolerance of parturient women for small doses of chloroform.

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* Read at a meeting of the Section of Anaesthetics, Royal Society of Medicine, November 3rd, 1922. (See also p. 925.)

THE PELVES OF RICKETY CHILDREN AS THE PRECURSORS OF THE RICKETY FLAT PELVES OF WOMEN.

BY

HUGH T. ASHBY, B.A., M.D.CAMB., M.R.C.P.LOND.,

VISITING PHYSICIAN TO THE MANCHESTER CHILDREN'S HOSPITAL AND TO THE SALFORD ROYAL HOSPITAL.

IT would appear that during the last few years a larger number of women have suffered difficulty at childbirth on account of small pelves, and a larger number of Caesarean sections have been done in lying-in hospitals, than before. This difficulty is accounted for almost entirely by the rickety flat pelves so common in women who have had rickets in childhood. Hitherto little has been written about the normal or the rickety abnormal pelves of children. In order to find

out when the rickety flat pelvis starts I have made a large number of measurements of the pelves of normal children and compared them with the measurements of pelves of children with rickets. The pelvis of a child with rickets shows little outward signs of any abnormal measurements. In all nearly 150 pelves of normal healthy children of all ages from 1 to 14 years have been examined and the results tabulated.

With callipers as ordinarily used in midwifery the distances were measured between (1) the anterior superior spines of the iliac crest, (2) the iliac crests, (3) the trochanters, and (4) the external conjugate diameter. These measurements are easily made; they show that the pelvis of a normal child slowly and regularly increases in size.

The pelves of over 150 female children with rickets, at all ages from 1 to 14 years, were measured in the same way. On comparing the normal pelves with the rickety some very marked differences were apparent, the most noticeable being the relative smallness of the external conjugate in rickets. This difference becomes more marked as the children grow older; thus at the age of 5 years the external conjugate in normal children averaged 4.8 inches, and in rickety children of the same age only 4.1 inches. At the age of 13 years the external conjugate was 6 inches in normal children and only 4.9 inches in rickety children—a difference of over an inch.

Table giving the Measurements of Normal and Rickety Pelves of Children aged 1 to 14 years.

Age in Years.	Normal.				Rickety.			
	I.S.	I.C.	E.C.	Tr.	I.S.	I.C.	E.C.	Tr.
1 to 2 ...	5.4	5.6	3.8	6.0	4.8	5.2	3.4	5.9
2 to 3 ...	5.8	6.0	3.8	6.3	5.2	5.5	3.4	6.1
3 to 4 ...	5.8	6.1	4.0	6.9	5.3	5.9	3.5	6.5
4 to 5 ...	6.0	6.5	4.0	7.0	5.8	6.2	3.8	6.6
5 to 6 ...	7.0	7.5	4.8	7.9	6.0	6.5	4.1	7.2
6 to 7 ...	7.0	7.5	4.85	8.0	6.2	6.7	4.1	7.15
7 to 8 ...	7.1	7.8	5.1	8.0	7.0	7.5	4.8	8.2
8 to 9 ...	7.1	7.6	5.4	8.0	6.6	7.0	4 6	7.4
9 to 10 ...	7.25	7.5	5.5	8.75	7.75	8.5	5.0	8.5
10 to 11 ...	7.75	8.25	5.75	8.75	7.8	8.8	5.0	9.3
11 to 12 ...	7.75	8.25	5.75	8.75	7.8	8.5	5.0	8.9
12 to 13 ...	8.0	8.5	6.0	9.0	7.8	8.0	4.9	9.4
13 to 14 ...	8.5	9.0	6.5	9.6	8.2	8.2	5.4	9.5

I.S. = Measurement between the iliac spines. I.C. = Measurement between the iliac crests. E.C. = External conjugate. Tr. = Measurement between the trochanters.

This diminution of the external conjugate is the marked feature of the rickety flat pelves of women and the cause of so much difficulty at childbirth. The pelvis, including the sacrum and iliac bones, like the other bones, are softened in rickets and liable to bend under strain. The chief cause of the diminished external conjugate is that the sacrum is bent and displaced forwards by the body weight. The promontory of the sacrum is carried in this way nearer the symphysis. The smallness of the external conjugate in older children shows this clearly, for it is relatively much smaller than at the earlier ages. As the child grows older and heavier the weight pushes the sacrum downwards and forwards towards the symphysis. This diminution of the external conjugate even in early life proves that it is the rickets of early childhood which is the origin of the typical flat pelves of women.

The other measurements, interspinous and intercristal, are not markedly less in rickets than in the normal. After the age of about 9 years the interspinous measurement becomes slightly larger in rickets than in the normal. This is to be explained by the fact that the body weight presses out the iliac crests, so that the iliac fossae look forwards instead of forwards and inwards.

In the rickety flat pelves of adults the measurement between the spines approximates closely to that between the crests, owing to the pressing outwards of the spines by the body weight. This is not so in children until near puberty, when the body weight increases so much. The measurement between the trochanters is greater in rickety than in normal children, especially after the age of 7 years. This is no doubt due for the most part to coxa vara—a common condition in rickets—but partly to the thickened great trochanter. The average height of the rickety children measured was less than the normal height for age, owing to their lack of development, lordosis, and the curvature of the legs.

The conclusion to be drawn from these measurements is that rickets in early childhood, and continuing during childhood, is the cause of the rickety flat pelves of adult women, and as long as rickets remains prevalent so will there be difficulty and danger with childbirth in a number of women, especially among the populations of large towns.

At present rickets shows little diminution, and the large amount which occurred during the war and since will continue to leave its mark in future years, when these children get married. It is to be hoped that the large amount of work which is being carried out all over the country on the cause and treatment of rickets will diminish its frequency in the future.

I am much indebted to Dr. J. W. Bride for his help and co-operation in this short article.

AN OUTBREAK OF DIPHTHERIA DUE TO INFECTED MILK.

BY

A. E. PORTER, M.D., D.P.H.,

MEDICAL OFFICER OF HEALTH FOR THE BOROUGH AND RURAL DISTRICT OF REIGATE.

MILK-BORNE epidemics of infectious diseases are seldom without points of interest, and a small outbreak of diphtheria, which occurred in the borough of Reigate during December, 1921, and January, 1922, was no exception.

Diphtheria had been somewhat unusually prevalent during 1921, sixty-five cases being notified in a population of slightly under 29,000. Only nine of the patients were above the age of 15; most of them were members of working-class families, and, apart from two small groups, where school infection was prominent, the cases occurred at appreciable intervals, with no obvious connexion one with another.

Between January 4th and 17th, 1922, however, I received notifications of fourteen cases of diphtheria, occurring in thirteen different houses, scattered over various parts of the borough (which has an area of 6,000 acres), every house being supplied with milk from one retailer; there was no other factor in common. Eight of the patients were adults, and nine of the houses were large residences, while two of the patients living in cottages were daily maids in large houses supplied by the same retailer. The attacks among the fourteen patients ranged from December 22nd, 1921, to January 14th, 1922. Six of the fourteen patients were males.

Five individuals were attacked on January 4th, three on January 6th, two on January 7th, and one each on December 22nd and January 1st, 8th, and 14th. A further case, a boy of 6, who was attacked on December 25th and notified on December 27th, also had milk from the same retailer.

Inquiries at the houses showed that all the patients consumed the milk as delivered, though in some of the larger residences milk intended for the children was boiled as a matter of routine. None of these children were attacked.

During January four further cases of diphtheria occurred; one of these, consuming milk from the suspected retailer, was infected whilst in London; the remainder were supplied from other sources. Among the cases notified earlier in December and those notified after January 17th there was no reason for attaching suspicion to any milk supply. This particular outbreak may therefore be considered to include fifteen cases in fourteen different dwellings.

I began to suspect that milk was the source of infection about January 9th, and on January 10th I wrote to all the general practitioners suggesting that as opportunity offered they should recommend their patients to boil all milk delivered, and I issued a letter in the local weekly newspaper on January 13th advocating the same precaution. From a purely scientific point of view this may have been regrettable, but the measure was justified by subsequent occurrences.

The implicated retailer sends out about 450 gallons a day, and supplies some 2,100 houses. The milk is derived from thirteen different farms, situated in Surrey, Sussex, and Kent.

Milk from each farm is distributed so far as is practicable to one particular round, and it was possible, therefore, to ascertain the farm from which all but one of the infected houses obtained milk. I fully expected that one farm would be implicated especially; but this was not the case, since no less than five different farms were concerned. If these are indicated by the letters A, B, C, D, and E, A supplied three houses, B one, C three, D three, and E three, whilst the fourteenth house had milk occasionally from A, occasionally from C, and occasionally from D.

Each round had a different roundsman, and infection during delivery appeared, therefore, to be out of the question. Infection at the receiving station seemed a possible solution. On inquiry I found that, as the farm churns arrived, the milk was emptied into a measuring drum, cooled (if this had not been effected at the farm), and passed through a strainer into the roundsmen's churns, the strainers consisting of four thicknesses of muslin over a metal frame. All churns and other utensils were thoroughly sterilized by steam after use. Only two men handled the milk at the dépôt. On January 11th I took swabs from the throats and noses of both, and obtained negative bacteriological results. Neither of them had recently suffered from any kind of illness, they had no families, and there had been no illness in their homes.

It is obvious, however, that if the milk from one of the farms were infected, the muslin strainer would be likely to retain some of the bacilli, which might readily infect milk from other farms when passed through the strainer subsequently, and this appeared to be the most likely solution of the problem, since it is almost inconceivable that five farms should be infected simultaneously.

Farms A, C, and D are situated in Reigate rural district, B in an adjoining rural district, and E in Kent. Inquiries at these farms yielded no information of illness resembling diphtheria among the farm hands or their families. Farms C and D are situated in a parish where there had been an outbreak of diphtheria, comprising fifteen cases in thirteen families between August 29th and December 22nd, 1921, with four further carriers in infected houses. It had been an unusually troublesome outbreak to deal with, owing principally to a concurrent epidemic of influenza, and to the omission to obtain medical advice in several instances. Although I had succeeded in identifying several "missed" cases, as well as a number of healthy carriers, I could not satisfy myself that all important sources of infection had been detected, and was left with the impression that further unrecognized attacks had occurred, probably among adults.

Early in November a schoolboy was removed to hospital whose eldest brother was a cowman at D farm. The cowman and all the other school children were examined bacteriologically, and the cowman and one girl were found to be carriers. Both were removed to hospital on November 6th, and were not discharged until February, 1922. The only other inmate of this house concerned with the farm was the father, who was bailiff. He had nothing to do with the cows, and was not examined. On January 12th I heard that the head cowman had been laid up with rheumatic fever since December 28th, and that the bailiff was doing his work. I swabbed his throat and nose that day, and obtained negative results. Negative results were also obtained at the Lister Institute a fortnight later. No cases had occurred in the neighbourhood of C farm.

So far, therefore, there was no evidence to incriminate D farm, although it appeared to be the most likely source of the Reigate outbreak. The milk from this farm is one of the earliest to arrive at the Reigate dépôt, and therefore is one of the first to pass through the strainer. I arranged that separate strainers should be used for A, C, and D farms on January 12th, and sent these to the Lister Institute for bacteriological examination, intending to await the report before taking any further action. As the public had largely adopted my suggestion of boiling their milk, there was little risk of a spread of infection. The examination was completed on January 25th, both cultural and inoculation investigations being made; diphtheroids were isolated, but no true diphtheria bacilli were found.

The problem, however, was solved on January 22nd, when another cowman, son of the head cowman from D farm, was removed to hospital with diphtheria. His faucial attack began on January 19th, but on admission to hospital he was found to have sores on both arms which had existed for nearly six weeks. Unfortunately energetic treatment was successfully applied before I had an opportunity of making a bacteriological examination, but I was assured that the sores had the appearance typical of diphtheritic infection of the skin. The inquiries made at each of the farms A, C, and D had included the existence or otherwise of such sores, but their presence had been denied in this instance. The farm supplied about seventy gallons a day, milking being carried out by four cowmen. In the course of the next few days I took swabs from the throats and noses of nineteen persons on the farm, including all the remaining cowmen and other farm hands and their families. Seven carriers were found, one being the head cowman, who had been laid up with rheumatic fever, as already mentioned, the remainder being children, three of them in cowmen's families. All were removed to hospital. I had the teats and udders of all the cows, thirty-three in number, examined. On the udder of one was a superficial ulcer, apparently of traumatic origin. A swab from it yielded a negative result. Another cow had a cyst in a dry quarter. All the remaining cows were healthy.

On January 23rd the milk from D farm was withdrawn from the retailer's supply, was pasteurized, and made into butter. Apart from a few gallons consumed by the families employed on the farm all the milk is sent into Reigate. It is curious that none of the children on the farm contracted diphtheria; but possibly some of the carriers were accounted for in this way.

Owing to the impossibility of confirming the nature of the sores on the young cowman's arms bacteriologically it cannot be asserted definitely that he was the actual infecting agent, though this is by far the most likely explanation. The illness which laid up his father was undoubtedly rheumatic fever, which may or may not have been associated with an attack of diphtheria; but in any case he was not engaged in milking at the time the outbreak was at its height. Although carriers were found in the family of another cowman he himself appeared to be free.

This outbreak differed from the usual textbook description in the absence of any marked suddenness in its appearance, and in the occurrence of only one instance of multiple attacks in the same household. It is also somewhat remarkable that so few cases should have occurred among the 8,000 or more consumers of the supply. This, however, may largely be accounted for by the practice of allocating the milk from each farm to a particular round.

The character of the attacks was mild. There were no deaths, but in many instances the infective period was a very long one.

THE ACTION OF CARBON TETRACHLORIDE ON THE LIVER.

BY

J. F. DOCHERTY, B.A., M.B.TORONTO,

DIRECTOR OF ANCHYLOSTOMIASIS CAMPAIGNS FOR CEYLON;

AND

E. BURGESS,

ACTING DIRECTOR OF BACTERIOLOGICAL INSTITUTE.

In view of the report by Dr. W. G. Smillie and Dr. S. Pessoa[1] to the effect that carbon tetrachloride in small doses produced a definite fatty degeneration of the liver and kidneys of dogs it was deemed advisable, before using this drug generally in Ceylon as a vermifuge, to ascertain whether or not these lesions were produced in man, using the maximum dose of 5 c.cm. as defined by Hampton and Nicholls.[2] Leach[3] reports from autopsy that no macroscopical change was noted in the liver or kidney following a 12 c.cm. dose; apparently no microscopical examination was made.

With the approval of the superintendent of prisons and the personal consent of the prisoners, two condemned men were treated with 5 c.cm. of carbon tetrachloride and one with 8 c.cm. in two doses of 5 and 3 c.cm. The anthelmintic was given on an empty stomach, followed by tiffin of rice at the hours mentioned, and, as indicated, No. 1 received a post-purge of 1 oz. of saturated magnesium sulphate solution three and a half hours later; No. 2 received the same eight hours after treatment; while No. 3 received none, having vomited the first and declined the second.

Autopsies were performed on dates mentioned, when the entire intestinal tract from the pylorus to, but not including, the rectum was removed after being double ligatured in

order to keep the contents for examination. The liver and left kidney were removed in each case and examined macroscopically and microscopically. The following is a report of the examination and findings:

	Prisoner 1.	Prisoner 2.	Prisoner 3.
Date examined ...	July 15	July 31	July 31
Heart rate	82	82	72
Heart sounds	Normal	Normal	Normal
Systolic pressure ...	(?)	118	116
Diastolic pressure ...	(?)	82	79
Urinalyses:			
Albumin	Trace	Negative	Negative
Specific gravity ...	1.016	1.014	1.012
Sugar	Negative	Negative	Negative
Microscopic	Negative	Negative	Negative
Faecal examination:			
Anky. duod.... ...	Positive	Positive	Positive
Ascaris lumb. ...	(?)	Positive	Negative
Trichuris trich. ...	Positive	Positive	Positive
Oxyuris verm. ...	Negative	Positive (heavy)	Positive
Date of 1st treatment	July 16	August 1	August 1
Breakfast	Tea only	Nothing	Nothing
Hour treated ...	9 a.m.	8 a.m.	8 a.m.
Amount CCl_4 given	5 c.cm.	5 c.cm.	5 c.cm.
Tiffin	10.30 a.m.	10.30 a.m.	Declined
Condition of patient	11 a.m., dizzy	10 a.m., dizzy	10 a.m., dizzy, nauseated
Heart rate	86	80	88
Purge	12.30 p.m.	4 p.m.	4 p.m.; vomited at once
Worm count in 24-hour collection:			
Anky. duod.... ...	241	33	No movement in 24 hours
Ascaris lumb. ...	Negative	2	
Trichuris trich. ...	Negative	Negative	
Oxyuris verm. ...	1	98	
Post-treatment examination of faeces:			
Anky. duod.... ...	No examination	Negative	Negative
Ascaris	—	Negative	Negative
Trichuris	—	Positive	Positive
Oxyuris	—	Positive	Negative
Date of 2nd treatment	None given	None given	August 14
Breakfast	—	—	Tea only
Amount CCl_4 given	—	—	3 c.cm.
Hour treated ...	—	—	8 a.m.
Tiffin	—	—	10.30 a.m.
Condition	—	—	No complaints
Pulse rate	—	—	84
Purge	—	—	None given
Date of autopsy ...	July 22	August 15	August 19
Examination of bowel contents:			
Anky. duod.... ...	Negative	Negative	Negative
Ascaris	Negative	Negative	Negative
Trichuris	9	12	Negative
Oxyuris	Negative	17	14
Liver:			
Macroscopically ...	No change evident	Slightly friable	Very friable
Microscopically ...	No well-defined change	Granular degeneration of liver cells Leucocytic infiltration	Fatty degeneration of liver cells Diffuse leucocytic infiltration
Kidney:			
Macroscopically ...	No change evident	No change evident	No change evident
Microscopically ...	No change evident	No definite change	Cloudy swelling of proximal tubes

From the above it is quite evident that the anthelmintic, in the quantities mentioned, produced lesions in the liver in two cases, as Smillie anticipated; on this account it seems in advisable to prescribe even a 5 c.cm. dose with purgation, let alone without. It is apparent also that this dose as a maximum borders on the danger line. A safe maximum seems to be 3 c.cm., since it has been given to a number of patients in Ceylon without producing any feeling of discomfort, though so far no autopsy has been performed on any individual so treated to ascertain whether or not the kidney or liver was injured.

From its action as a vermifuge we agree with both Leach's[3] and Hampton and Nicholls's[2] report that it seems to be practically specific for ankylostomes, fairly efficient in the removal of *Ascaris lumbricoides* and *Oxyuris vermicularis*, and of little value in the elimination of *Trichuris trichiura*.

We wish to thank Mr. A. F. G. Walker, Superintendent of Prisons for Ceylon, for his assistance and the interest shown in the experiments, and Dr. S. Chelliah, M.B., C.M., assistant pathologist of the General Hospital, for his confirmation of the pathological findings.

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NINETIETH ANNUAL MEETING
OF THE
British Medical Association.
Held at Glasgow, July, 1922.

PROCEEDINGS OF SECTIONS.

SECTION OF MEDICINE.

Professor T. K. Monro, M.D., F.R.F.P.S., President.

PRESIDENT'S INTRODUCTORY REMARKS.

Professor T. K. Monro, in offering to the members of the Section a very hearty welcome to the city and to the classroom in which they met, remarked that in the regulations drawn up by the Council of the Association there was a merciful provision that the President of a Section should not deliver a presidential address. He, therefore, in a few words described the arrangements which had been made for the three days' work of the Section.

DISCUSSION ON EXOPHTHALMIC GOITRE.

OPENING PAPER

BY

GEORGE R. MURRAY, D.L., M.D., D.C.L., F.R.C.P.,
Professor of Systematic Medicine in the University of Manchester; Senior Physician to the Manchester Royal Infirmary.

In arranging a discussion on exophthalmic goitre it is important to select certain aspects of this subject for consideration so as to elicit definite information or opinions upon them from those taking part in the discussion. Although much attention has been paid to the pathology, symptoms, and treatment of this malady, too little consideration has been given to its prevention, and it will be useful to consider what is known of its causation so as to discuss what measures can be taken to prevent the onset of the disease or to check its development in the early stages, even if this is possible in only a small number of cases. It will be advisable, in the first place, to allude to the pathology of the condition and, incidentally, to the cause of one puzzling symptom—the exophthalmos. Prevention and a few indications as to treatment will then be considered.

At the Annual Meeting of this Association in 1896 I opened a discussion[1] on the pathology of exophthalmic goitre and briefly reviewed the current views of the day, adducing evidence which led to the conclusion "that in exophthalmic goitre there is an excessive formation and absorption of thyroid secretion which may or may not be normal in character and that the symptoms of the disease are due to the presence of this excess of secretion in the blood, and to its action upon the tissues and especially upon the nerve centres in the medulla." This view of the essential nature of the malady is still generally accepted and the term "hyperthyroidism" is used to denote the various degrees of thyroidal overactivity. In a recent British Medical Association lecture[2] I have indicated a convenient clinical classification of the main types of hyperthyroidism, but on this occasion it is advisable to discuss only exophthalmic goitre and not the minor degrees of hyperthyroidism.

The acceptance of the view that exophthalmic goitre is due to a thyroidal toxaemia has directed attention to the importance of treating the thyroid gland, and experience has shown that when, as the result of either medical or surgical treatment or in consequence of spontaneous atrophy, the secretion is reduced to normal amounts, recovery from the malady takes place. This sequence of events appears to be a strong indication that the thyroid alone of the endocrine glands is primarily at fault in this disease. It has been suggested that one or more of the other endocrine glands may play a primary part in the production of symptoms, but no clear evidence has been brought forward to support this view. The thyroidal hormones certainly play a part in stimulating the activity of other endocrine glands, just as they increase the activity of the sweat glands, but this appears to be entirely a secondary result of a primary hyperthyroidism. The symptoms can almost all be accounted for

by a chronic thyroidal intoxication, and have been reproduced in man by giving large doses of thyroid extract. The actual causation of the exophthalmos, which is such a striking feature in many cases, is, however, still under consideration, and it is to be hoped that further information on this subject may be elicited in this discussion.

It has been held that the proptosis may be due to vascular engorgement, to muscular action, or to excess of orbital fat. As it cannot be reduced by pressure on the eyeball and persists after death, it cannot to any appreciable extent be due to venous engorgement. It has often been stated that the protrusion is due to the action of Müller's muscle, but this has always appeared to me to be a totally inadequate explanation. I have consulted my colleague Professor J. S. B. Stopford as to the anatomy and action of these muscular fibres, and he has kindly given the following information. In 1858 H. Müller described a layer of unstriped muscle bridging over the spheno-maxillary fissure and posterior part of the infraorbital canal. This muscle corresponds to a more extensively developed layer which is found in the periorbital fascia of various mammals. It is attached to the periosteum, and is innervated by the sympathetic nervous system. In his own dissections Professor Stopford has not found it possible to recognize this muscle macroscopically in the human orbit. It is only on microscopical examination of the tissue removed from the region of the spheno maxillary fissure that a few smooth muscle fibres may be found. It is obvious that such a feeble muscle could have no power of producing proptosis against the normal action of the external ocular muscles and of the optic nerve in holding the eyeball in its proper position. In addition to this, Professor Stopford gives three reasons for concluding that it seems impossible for Müller's muscle to be responsible for exophthalmos in the human subject: (1) Müller's muscle is only composed of a few scattered fibres, and it is quite rudimentary and atrophic in man. (2) Even if this muscle had an appreciable power of contraction, it is too far from the globe, and chiefly separated from it by compressible fat, to have any power to project the eye forward. (3) If it had any action on the globe it would push it obliquely upward and forward. The same arguments would, I consider, also largely apply to the fibres described by Landström. It is to be hoped that this inadequate explanation will disappear from our textbooks.

In almost all other forms of proptosis there is a definite mechanical cause to be found, and in exophthalmic goitre fat is certainly present in excess in the orbit in many if not in all cases. I have recorded a fatal case in which, in spite of marked general emaciation, half an ounce of fat was dissected out of one orbit. I am unable to explain why fat should accumulate in this position, and as far as I am aware no special examination of this orbital fat has yet been made to determine if it differs in either structure or chemical composition from normal fat. It seems clear that this excess of fat in the orbit is the essential cause of the proptosis in Graves's disease and accounts for its persistence in many cases after the other symptoms have subsided and the patient has practically recovered. The fat when removed during life has been found to be oedematous and slight variations in the degree of proptosis from time to time may be due to variations in this oedematous condition.

In speaking of recovery from Graves's disease it must be remembered that, although there may no longer be any hyperthyroidism, results such as exophthalmos or chronic myocarditis may persist long afterwards, just as chronic renal disease may persist after scarlet fever or chronic endocarditis after acute rheumatism. As this aftermath of exophthalmic goitre often militates against the complete success of any line of medical or surgical treatment in severe or chronic cases, it is important to examine briefly the conditions which favour or excite the development of exophthalmic goitre, as well as the conditions which aggravate mild into serious forms, or induce relapses after periods of improvement. A full discussion of these factors may supply information which will help us to prevent the onset of the disease in some cases and to avoid aggravating it, when already present, in others. In many cases no adequate cause can be ascertained, and we cannot explain why the disease has developed.

For the purpose of this discussion I have reviewed my notes on 300 cases of exophthalmic goitre, 71 of which were men and 229 women, seen in private practice during the eleven years 1911–21. This proportion indicates that women are much more prone to suffer than men. It is of interest to note that in this series the malady occurred about three times as often in women as in men. In another series of 120 cases which I recorded[3] in 1903, the proportion was exactly eleven to one. This difference suggests that the disease now occurs more frequently in men than it did formerly. Be this as it may, it is evident that sex is still one important predisposing factor. In no less than 232 (77 per cent.) no other predisposing or exciting cause was found. It has long been recognized that family predisposition occurs in some cases, as a mother and daughter or two or more sisters may be affected at the same or different periods of life. Dr. Hector Mackenzie[4] found a family history of the disease in 10 per cent. of 438 hospital and private cases. This tendency was present in 26, or nearly 9 per cent., of my cases. This predisposition should be borne in mind, and any early signs of hyperthyroidism in a relation of a patient suffering from Graves's disease should be treated promptly as soon as they appear. Either sudden or prolonged nervous strain may be a precursor of the disease in some cases, but not so often as the more striking examples might lead one to expect. A sudden nervous strain, such as is caused by an accident, fright, or emotional shock, had occurred in 38 (13 per cent.) of my cases, while prolonged periods of anxiety or worry owing to either domestic or financial causes were recorded in 17 (6 per cent.) cases. Overwork was given as a cause in 11 (4 per cent.) cases, and nursing, chiefly in war hospitals, in 8 (3 per cent.). It is remarkable that exophthalmic goitre does not often follow physical injuries, as in only 9 (3 per cent.) of my cases had an accident occurred, and 7 had recently undergone an operation. In a separate series of fifteen soldiers suffering from various degrees of hyperthyroidism, who were under my care at the Manchester Royal Infirmary, not one had been wounded. In these 15 cases the symptoms had developed in 4 after the explosion of a shell or mine, in 1 after prolonged exposure to fire in the trenches, in 5 after dysentery, malaria, or tonsillitis, and in the remaining 5 after the stress of general service conditions during the war. I do not remember seeing a single case of exophthalmic goitre following a wound in a military hospital in either England, France, or Italy. It will be interesting to learn the experience of others in this respect.

The strains and accidents of life we cannot prevent, but in those who have been subjected to them we should be on the look-out for early signs of hyperthyroidism, special care being exercised in the case of women who have a family history of thyroidal disease or who already have some enlargement of the thyroid gland. The occupation of teaching appears to be a predisposing factor, as 11 (4 per cent.) of my cases were school teachers. Some educational authorities now realize this, and are unwilling to accept a young woman with a goitre as a teacher owing to this liability to develop a toxic adenoma or Graves's disease in later life. If any septic focus is present naturally it must be treated, as it will tend to aggravate the symptoms, but there is little sound evidence to show that septic infection is a cause of the malady, as in my series it was present in only two cases. Of general infections influenza is notable in that it shortly preceded the onset in 18 cases. Exophthalmic goitre is a widely spread disease, and it is difficult to determine the influence of locality on its development. It is remarkable, however, that 19 of my cases came from one part of the valley of the river Goyt, which divides Cheshire from Derbyshire.

One other aspect of this subject I wish to mention, and that is the relationship of simple parenchymatous goitre to exophthalmic goitre. In a certain number of cases of simple goitre symptoms of hyperthyroidism appear and the condition is known as toxic adenoma; in a smaller number definite exophthalmic goitre appears. This occurred in 12 of my cases. The proportion of cases in which this occurs is not known, but it is sufficiently large to encourage us to make more energetic attempts to prevent or treat cases of parenchymatous goitre which are so often regarded as harmless and to be on the look-out for the earliest indication of hyperthyroidism. In a certain number of cases there is both a predisposing and an exciting cause, so that in a patient with family predisposition or a pre-existing goitre the onset of the disease follows a nervous shock or strain. Endemic goitre in some cases is due to a deficiency of iodine in the body, and it has been suggested by Professor Mellanby[5] that the influence of cod-liver oil in preventing abnormal changes taking place in the thyroid gland of animals fed on a certain diet is due, in part at least, to the iodine it contains.

In America it has been found by Kimball[6] that the administration of small doses of iodine, such as 3 grains of sodium

iodide, daily for ten consecutive school days each spring and autumn to girls during the school age has been followed by a striking diminution in the number of cases of goitre in districts where it is usually endemic. This preventive treatment should be adopted in all such regions, and it is not unreasonable to expect that by diminishing the tendency to simple goitre in early life we may also lessen the number of cases of exophthalmic goitre occurring in later life. It must be mentioned in this connexion that treatment with iodine is quite unsuitable for those who already show any signs of hyperthyroidism. In taking these precautions the importance of a pure supply of drinking water must not be forgotten, as it has long been held that contamination of the drinking water plays an important part in the production of goitre.

As much may be done to prevent the development of Graves's disease by the suitable treatment of the earliest stage of hyperthyroidism, it may be pointed out that one of the earliest symptoms of this is a constant feeling of exhaustion or weariness. If a persistent increase in the pulse rate, some loss of weight, and an increase in the basal metabolic rate are also present, with, or even without, some increase in the size of the thyroid gland, they indicate, in the absence of any obvious cause, an early hyperthyroidism even before it is recognizable by the usual clinical signs. Prompt treatment by rest, suitable diet, *x* rays or radium, and drugs has then its best opportunity, and may prevent further development of the malady into actual Graves's disease.

The same principles may also be applied to those who already suffer from the disease so as to save them as far as possible from preventable aggravation of their symptoms. An attack of influenza so often increases the severity of the symptoms that every possible precaution should be taken to protect patients from this infection. If influenza is contracted rest in bed must be continued until the pulse returns to its previous rate and convalescence is fully established. Neglect of this precaution may result in an aggravation of symptoms lasting for weeks or even months. When pregnancy occurs in a patient suffering from exophthalmic goitre it should be allowed to continue to its natural termination. Should a miscarriage or premature birth take place special care is required as well as a prolonged period of rest afterwards. During a normal pregnancy and during the period of lactation the symptoms are often notably diminished, but there is a marked tendency for them to flare up again just after the birth of the child or later on when it is weaned, so that great care must be exercised at both of these times. Residence at the seaside frequently aggravates the symptoms of Graves's disease, and is therefore to be avoided.

As I have so recently expressed my views on treatment elsewhere[2] they will only be briefly summarized here. As we shall have the advantage of hearing Mr. James Berry's experience of the surgical treatment of Graves's disease my remarks will be chiefly confined to medical treatment. In slight or early cases—and the importance of recognizing these may again be emphasized—medical treatment alone is required. This consists of rest, suitable diet, and radiological combined with medicinal treatment, the details of which must be adapted to the requirements of each individual. In cases of medium severity a similar course of treatment should be carried out for not less than six months. If, however, time is a matter of great consideration to the patient or the thyroid gland is much enlarged surgical treatment may be advised at once. If medical treatment has failed to bring about definite improvement by the end of six or twelve months, operation may be advised.

The chief difficulty arises in those cases in which the symptoms are severe when the patient first comes under observation, and it is desirable to reduce the hyperthyroidism as soon as possible. It is just in these cases that the risks of an operation are considerable, and I should like to know if these are lessened by a preliminary ligation of one or more thyroid arteries. As a rule this preliminary operation, which has been largely practised in America, seems to me to be unnecessary. In any case I am convinced that, if a thyroidectomy is undertaken, at least three-fourths of the goitre should be removed, otherwise improvement is only partial and patients are disappointed to find that, after accepting the risk of an operation, they are by no means free from symptoms.

REFERENCES.

[1] BRITISH MEDICAL JOURNAL, October 3rd, 1896. [2] Ibid., June 10th, 1922. [3] *Medico-Chirurgical Transactions*, vol. lxxxvi. [4] *Lancet*, November 11th, 1916. [5] BRITISH MEDICAL JOURNAL, May 27th, 1922. [6] *The Thyroid Gland*, G. W. Crile and Associates, p. 175.

DISCUSSION.

Dr. C. M. WILSON (London) said that at a discussion on exophthalmic goitre held at the Royal Society of Medicine in 1921, he had ventured to point out the disquieting similarity between that debate and one held in the same place in 1912. They were concerned not with some difficult and intricate problem of causation, but with the actual results of treatment, and yet a decade had gone by without bringing them any nearer agreement. Those who sought guidance in following a rational procedure in the treatment of exophthalmic goitre were hampered by the vague language in which results were recorded and by the fact that there were too many advocates in these discussions. They might hope that when basal metabolic measurements displaced such terms as mild, moderately severe, and severe types, so that the degree of severity of a case of Graves's disease, before and after treatment, could be expressed in figures and not in language coloured by the natural gratification of surgeon or radiologist in bringing about a cure, it would then be possible to tell exactly what type of case was being recorded and the precise result of the particular treatment instituted.

These discussions were devoted to the management of what was termed a severe, or moderately severe, case of exophthalmic goitre. What happened to such a patient when admitted to hospital? Commonly rest in bed was followed by improvement, and that improvement continued for two or three weeks. For example, if the clinical course was recorded in measurements of the basal metabolism, the figure representing the basal metabolic rate fell during that period from, for example, + 55 to + 30, but at the end of that time no further fall occurred. No matter how long the patient was kept in bed, the figures remained at about the same level. Three alternatives were now open to the physician: (1) he might allow the patient to be discharged from hospital better than on admission but not cured; (2) he might resort to *x* rays; or (3) he might call in a surgeon. Such discussions as the present one were entirely taken up with the conflicting arguments for each of these three alternatives. With regard to the first course this was a rational line to follow, if they agreed with Sir William Hale-White that exophthalmic goitre was a disease that tended, in the course of a few years, to cure itself, and that meanwhile no great harm would befall the patient or her tissues. For, if that were so, all they stood to lose by adopting conservative measures was a period of invalidism extending, perhaps, over some years; that might be for many economically impossible. But if that view was not in accordance with their clinical experience, if it remained in the field at all simply because its refutation depended on following a sufficient number of cases over several years, which was in practice exceedingly difficult, if in brief their experience was his, that a comparatively large number of patients with this disease suffered grave and permanent damage to their tissues, they would then be reluctant to allow the patient to leave hospital, better it was true, but too likely to shed the benefits conferred by hospital immediately she was submitted to the stress of everyday life. They would feel that some further attempt must be made to bring down the basal metabolic rate to normal.

To that end, since rest and the administration of drugs had done all they could do, they were compelled to call in the assistance of either the surgeon or the radiologist. It was maintained by some that surgery was both unnecessary and unsafe. Unsafe, because the mortality even in the hands of surgeons with special experience in operations on the thyroid gland was in the neighbourhood of 5 per cent.; unnecessary, because the disease tended in time to cure itself. If, however, they agreed with the view he had put forward, that exophthalmic goitre was a grave disease, and that it was the duty of a physician not to rest content till the excessive activity of the gland had been reduced to within normal limits, if they took that view, then they would not be turned aside from its logical consequences, even by a mortality as high as 5 per cent., provided always that there was no safer alternative. Did such an alternative exist? It was true that the effect of *x* rays was uncertain and often disappointing in the later stages of the disease, and it was also true that neither by basal metabolic measurements nor by clinical means could they say, in advance, which cases would respond to *x*-ray applications and which would fail to respond. Yet he would ask, Would a physician, knowing the mortality to be 5 per cent., submit, if he had Graves's disease, to an immediate operation, when there was a reasonable possibility

that the same end might be attained by the radiologist without any risk? He thought that in these circumstances he would think discretion the better part of valour, and well knowing that six months might be spent without profit in giving *x* rays a trial, he would, nevertheless, deliberately choose the path of safety.

The matter has been well put by Mr. Walton of the London Hospital, who had said that he never operated in the first six months of the disease. He would like to amplify that advice by saying that if an intelligent patient were in possession of all the pros and cons she would probably decide that while she would not have an operation in the first six months of the disease, she would not allow more than a year to elapse without seeking surgical assistance, if other and safer means of treatment had then failed to bring the basal metabolic rate down to normal. That appeared to him to be the sane and simple conclusion to which they were driven by all the facts. Their judgement would not be swayed by overstatement on the part of either surgeon or radiologist. Some surgeons came to these discussions contending that the desired result in that disease was more certainly and more permanently attained by operation than by any other means. That was a comparative claim. It implied that the surgeon either had personal and prolonged experience of other methods, or, in default, that he had access to published statistics with which he could compare his own results. But, as they knew, no such data existed. Without such an intimate experience of alternative measures, these surgeons' results had only the value of uncontrolled experiments. Others brought patients and photographs of patients to prove that overactivity of the thyroid gland could be controlled by operation, a point no one disputed. The immediate benefits of surgery were not in question; they were concerned rather with the permanency of such results and with the necessity for operative measures. They should not be driven by the zeal of enthusiasts to deny the benefits surgery conferred in this disease when all other means had failed. Perhaps this warning was superfluous in that debate because they had the advantage of Mr. Berry's experience and cautious outlook.

But, he would ask, were they not on the wrong tack altogether in devoting these discussions to the care of severe and moderately severe cases of Graves's disease? Would it not be altogether more profitable if they could ban the mention of such phases of the disease so that they might hear something of early diagnosis and of the causation of exophthalmic goitre? In other diseases their one aim was early diagnosis, so that treatment might be instituted when it would be most effective. But if unusually favourable results were reported in the treatment of exophthalmic goitre they were met with the criticism that the cases described were not Graves's disease at all, because they lacked this or that sign of the complete classical picture, till they were led to question whether this disease had a youth at all. If they were discussing the treatment of pulmonary tuberculosis would they confine their remarks to cases with cavity formation? These discussions were frittered away in desperate attempts to patch up the damaged tissues of patients when the malady had reached a late and intractable phase, whereas they surely should be devoted to the means necessary to prevent that damage.

That brought him to basal metabolic measurements. By means of these they could follow the clinical course of a case as upon a chart, so that they learnt when rest had done all that it could do, when to operate and when not to operate, and to record their results so that they were intelligible to others. These measurements rendered diagnosis practicable at a time when it was uncertain clinically and they encouraged the physician to institute vigorous treatment when it was most fruitful in results, by assuring him that there was an overactivity of the thyroid and by convincing him that at such a stage it could be rapidly reduced to normal limits. They might even claim that these measurements alone made such early treatment possible, for without them there was a probability that the *x* ray applications would be continued till a condition of hypothyroidism was produced. It was quite unsafe to use *x* rays at such a stage of the disease without checking the treatment by measurements of the basal metabolic rate. If that warning were neglected it would not be long before the most sceptical was convinced of the potent influence of *x* rays over the functions of the thyroid gland. He had been impressed by the need for caution by the remarkable effect of such treatment in women suffering from so-called functional menorrhagia without any abnormal pelvic signs to account for the loss. Working with Mr. Bourne, he had found in these patients a raised basal metabolic rate, though the thyroid was often not enlarged. *X*-ray applications to the thyroid were followed by speedy relief of a type of menorrhagia that had generally resisted curettage and other treatment. He thought that the circumstances in which this condition arose threw an interesting light on the difficulty of saying what was Graves's disease and what was not, and on the effect of treatment of hyperthyroidism by *x* rays. Along these lines they might progress to a time when the cases to which they now devoted these debates would be regarded as clinical curiosities.

Mr. JAMES BERRY (London), after thanking the committee of the Section for kindly inviting him, an operating surgeon, to take part in the debate, said that the subject was essentially one for collaboration between physicians and surgeons. He drew attention to the excellent series of specimens of exophthalmic goitre that Dr. Scott Williamson and Dr. Innes Pearse had sent to the pathological exhibition, and commented upon the solidity of the gland, the great increase in cellular elements, and the almost complete absence of colloid in all the specimens. In the short time at his disposal he thought it would be best if he limited himself to giving his own personal views on the indications for and against operation, and to the principal dangers of the operation, and the best means of avoiding them, without going into operative details.

In many respects he found himself in agreement with Professor Murray and Dr. Wilson. He did not think that early and mild cases of true exophthalmic goitre required operative treatment, since many such cases recovered spontaneously under medical treatment and rest, with or without the help of *x* rays. *X*-ray treatment should not be carried out too energetically or for too long a period, as it might easily lead to myxoedema or other complications. Advanced cases of many years' duration in which the disease had practically died out, leaving behind it exophthalmos, a fibrosed gland, and a permanently damaged and irregular heart were also unsuitable for operation. Ultra-acute cases with great mental excitement (amounting sometimes to actual mania), very rapid emaciation, and excessive muscular weakness were also not suitable, especially if electrocardiographical examination showed acute myocardial degeneration of the heart muscle. He expressed his indebtedness to Dr. Strickland Goodall, who had for many years been seeing cases of exophthalmic goitre with him. Cases of myocardial degeneration, whether early and acute, or late with much dilatation, were especially dangerous, as the patients were apt to die from sudden heart failure either before, during, or shortly after operation, or indeed without any operation. The existence of such cases would be recognized by all operators who had had much experience of exophthalmic goitre operations.

The course of Graves's disease was rarely steadily progressive. There were usually ups and downs in its course. It was not during an exacerbation, but rather during a remission in the severity of the symptoms, that operation could be undertaken with the best prospect of success. Yet it was just during a period of exacerbation that usually the patient, and sometimes the doctor, was most anxious for operation. It had been well said that an operation for exophthalmic goitre should never be looked upon as an emergency operation. In some fairly acute cases, especially those of rather large goitres, in which removal would be too dangerous, a preliminary ligation of one or both superior thyroid arteries was, in his opinion, of great value. The patient often improved so much after this small operation that a subsequent removal could often be performed with much less risk. He had not himself lost a case after ligation for more than ten years, although he had performed a large number within this period. Ligation of the inferior thyroid artery he now never performed. It was probably very nearly, if not quite, as dangerous as removal of a lobe and was certainly much less efficacious. It was his custom never to operate upon an exophthalmic goitre unless it had been at least several days under his personal observation in a nursing home. In this period fright was largely eliminated, the heart generally quietened down considerably, and the patient gained confidence. All these were valuable adjuncts to the operation. He never operated upon a frightened or unwilling patient. He always warned the patient beforehand to expect that she would probably feel ill and miserable for a day or two afterwards. Consequently they were not unduly anxious when such symptoms did appear. He had no belief in humbugging patients by not telling them what they might

reasonably expect to suffer. Most patients who were really ill with exophthalmic goitre welcomed the operation rather than shrank from it, since it afforded them a prospect of relief. It was always wrong, in his opinion, to tell patients with true exophthalmic goitre that they would be cured immediately or even quickly by the operation. That was what they only too often expected, and they were apt to be disappointed when they found this did not occur. The utmost that could truthfully be stated was that the operation of removal of part of the goitre would almost certainly be followed rapidly (generally within a very few days) by great amelioration of most of the symptoms (except the exophthalmos, and that the prospect of ultimate complete, or nearly complete, recovery was greatly enhanced.

Mr. James Berry admitted that he did not like operating upon exophthalmic goitres. He felt that one could never tell when one might meet with a sudden and unexpected death in these cases. On the other hand, he liked to operate upon suffocating innocent goitres, and the worse the dyspnoea the better he was pleased, because with these cases he knew where he was. He knew that in the vast majority of such cases he could cure them rapidly and permanently by removing the source of the dyspnoea. In the last few hundreds of operations that he had performed for the removal of innocent goitres of all degrees of severity, excluding exophthalmic and malignant cases, but including many cases of what he had called "false" exophthalmic goitre, his mortality had been well under 1 per cent. With operation for the removal of true exophthalmic goitre he could not get his mortality quite down to 4 per cent., having lost 5 patients out of 116. If an operator included in his statistics (which he himself did not) cases of so-called "false" exophthalmic goitre—namely, cases of encapsuled tumours, cysts, or other forms of innocent goitre with some tachycardia and tremor—as was often done, the results could be made to appear much more satisfactory. These latter cases could usually be cured quickly and permanently, and with but little risk. But such cases, whatever their pathological relation might be to true exophthalmic goitre, only served to confuse the issue if they were classified with them in operative mortality statistics.

With regard to the ultimate results of operation for removal of exophthalmic goitre he regretted that he was unable to give these for all his cases up to date, but he referred to a consecutive series of 78 cases that he had communicated to the Royal Society of Medicine last year. They included all the cases operated upon during the years 1913 to 1919 inclusive and had been reported upon in 1920 at periods varying from a few months to seven years after the operations. Of these, two-thirds (53) were found to be practically well, able to do their ordinary work, and to enjoy life, although in many cases some traces of the original disease, especially the exophthalmos and a tendency to palpitation on exertion, still remained. One quarter (18) were "much improved," while 1 was "improved," in 2 there had been no improvement, 1 was worse, and 3 had died of the operation. None of this series had been untraced. With regard to the anaesthetic, he had entirely abandoned the use of chloroform, which he thought should never be employed for exophthalmic goitre operations, nor indeed for any goitre operations. Although local anaesthesia had its advantages for some cases, he usually employed a very light open ether anaesthesia.

Dr. James R. Riddell (Glasgow) said: The reasonableness of treating Graves's disease by x rays depends on the assumption that the disease or the symptoms are due to increased secretory activity of the thyroid. I think the facts are established that minute doses of x rays stimulate epithelial activity, while larger doses cause inhibition and destruction of epithelium, thickening of blood vessel walls with shrinkage of the vessels and increase of the fibrous elements in the tissues. In looking over the x-ray literature one finds reports of cases treated as long ago as 1905; thus the method has had time to be well tested, and the ever-increasing numbers reported prove that it has not been found wanting. It is difficult to speak of cures in such a disease as exophthalmic goitre, and I gather from the reports that complete disappearance of symptoms is claimed only in a small percentage. All are agreed, however, in claiming very great improvement in the patients' condition in about 80 per cent. of cases. While I have not kept exact records I have formed the opinion from my own experience that the above figure is substantially correct. The general opinion is that the symptoms disappear or improve in the following order: First there is an improvement in the pulse rate and condition. Then the sweating, tremors, and headaches become less and the weight increases. The thyroid does not always show much reduction in size, specially if it is hard and not much enlarged to begin with. Lastly the exophthalmos may subside in some cases, but often it does so only to a slight degree. I cannot say that I have myself noted any definite sequence of events.

It has been my custom to advise against x-ray treatment in those slight cases occurring in girls about puberty, on the ground that they usually get well without it, and on the general principle that the less one is exposed to x rays the better; but Dr. Russell H. Boggs of Pittsburg, in an excellent article in the *American Journal of Roentgenology*, 1919, speaks strongly in favour of x-raying these cases. Regarding technique there are two methods. One may give minute doses repeated at short intervals two or three times a week, or a full dose may be given once in three or four weeks, using hard rays filtered through several millimetres of aluminium (3 or 4 mm.). The first seems to be analogous to prescribing an ordinary tonic to be taken a few drops every twenty minutes instead of the more usual tablespoonful three times a day. It is not so accurately measurable and I can see no possible gain in it. It should be borne in mind that minute doses are stimulating to glandular activity, and it is possible that some of our failures may be due to this cause. It is to be remembered that atrophic changes go on for some months after x-raying has ceased; a myxoedemic condition can be produced. I have known one case in which the patient gradually recovered but had to take thyroid extract for nearly two years; the radiation was given for a skin condition, and the action on the thyroid was accidental. In some quarters it is said that the x-ray dose should be pushed and the softer rays used in spite of the fact that so to do will cause damage to the skin. I emphatically oppose this view. I am sure that the maximum benefit can be got without in any way damaging or marking the skin. I think that if benefit is not got after six to a dozen doses x-ray treatment should be abandoned.

Professor David Drummond (Newcastle-upon-Tyne) called attention to the frequency with which the condition of hyperlymphism was present in cases of exophthalmic goitre, and showed specimens from a recent *post-mortem* case, the patient having died suddenly after operation. The lingual tonsils were much enlarged and the thymus nearly five times the normal size, and in other directions there was great lymphatic increase. This state, amounting to status lymphaticus, he thought would often prove to be the cause of sudden death after operation, and that an attempt should be made to diagnose it. He also referred to the heart and pointed out that when enlarged this generally took place at an early stage; as the case advanced the heart underwent reduction in weight and became dilated, and was frequently the seat of brown induration. He was accustomed, notwithstanding the contrary opinion, to prescribe potassium iodide, and often with considerable benefit. He raised the question of the relationship between the state of hyperlymphism and Graves's disease, and offered the opinion that the symptoms were due not so much to excessive secretion of normal thyroid juice but to an altered (disordered) state of the secretion.

Mr. Marcus Mamourian (Ashton-under-Lyne) said: I was very struck with the instructive diagram shown by Dr. Wilson and the way he emphasized the critical point—that is to say, the point of maximum improvement under ordinary treatment by rest, etc., and the moment for deciding whether the case should be referred to the radiologist or to the surgeon. All I have to say is that every physician upon whom falls the decision should bear in mind that a course of x-ray treatment would increase the difficulties of the surgeon. Mention has been made of the surgical mortality. I do not think it fair that the figures of every novice should be included in statistical tables. Mr. Berry gives us 5 per cent. as his mortality rate. It is a magnificent achievement, and when one compares the evolution of the Wertheim operation, say, with the one for Graves's disease, I think the surgery of the thyroid may be considered as having made greater strides in the direction of safety. Local anaesthesia should be the narcosis of choice. The use of a local anaesthetic necessitates sure and confident technique.

Dr. H. L. Tidy (London) asked when a case of exophthalmic goitre could be considered "cured." Under x-ray treatment patients improved markedly in general condition and pulse

rate, and expressed themselves quite well and anxious to return to work, but the exophthalmos persisted and the thyroid was little, if at all, reduced in size.

Lieut.-Colonel R. McCARRISON, I.M.S., forwarded from India the following communication, which was read by Dr. H. L. TIDY:

I propose to confine my remarks to a brief reference to the present trend of research regarding the origin of this remarkable disease. Definite knowledge as to its pathogenesis is limited enough, and were it not that the faintest clue may prove to be of importance in the solution of the problem my contribution to this discussion might be summed up in a sentence: We possess as yet but little definite knowledge as to the causation of exophthalmic goitre. I read in an authoritative work published early in the present year that "the most generally accepted theory as to the pathogeny of exophthalmic goitre is that the disease is due to overactivity on the part of the thyroid, that an excess of thyroid secretion is poured into the circulation." It may be that "overactivity" of the thyroid gland occurs in this disease, and that an excess of thyroid secretion is poured into the blood stream, although for my own part I dislike the terms "overactivity" and "hyperactivity," preferring the more non-committal one of "disordered function." But little as we know of the genesis of Graves's disease we have, I think, sufficient reason to doubt the accuracy of the view that it is due to overactivity on the part of the thyroid gland. Its cause lies deeper than this and is extraneous to the gland itself. In addition to the thyroid other endocrine, glandular, and nervous structures are involved by it and in the production of the symptom complex. I know of no satisfactory evidence that an excess of normal thyroid secretion is actually thrown into the blood stream in exophthalmic goitre. Even removal of the major part of the hyperplastic thyroid, and the relief to certain symptoms afforded thereby, which might be supposed to be evidence of such excess, may be capable of explanation on other grounds. It is true that thyroxin, on subcutaneous injection, will give rise to symptoms similar to some of those present in exophthalmic goitre; but so also will tyramine—including widening of the palpebral fissure. An excess of the latter in the circulation might be suspected as a cause of exophthalmic goitre with as much reason as an excess of the former, did we but transfer attention from the thyroid to other organs and tissues of the body equally involved with it in this disease. I am of opinion that so long as we continue to concentrate attention on the thyroid gland alone, either from the point of view of pathology, symptomatology, or treatment, so long will we fail to understand this disease aright. Even if there be an excess of thyroid secretion in the blood stream in exophthalmic goitre this is the result of the disease-producing process, not the cause of it.

Recently Dr. Emil Goetsch has emphasized the importance of recognizing the early symptoms which as a rule precede the development of the well-known cardinal signs and symptoms of exophthalmic goitre as described in textbooks. Of these prodromal symptoms he accounts weakness or asthenia as an even more important feature than nervousness. "The patient is tired most of the time. She feels tired even without exertion, as on getting up in the morning. The slightest effort is often followed by the greatest fatigue; in fact, the asthenia is so great that the patient will not make even an attempt to do anything." Such is his description of this "early" and "characteristic" asthenia of exophthalmic goitre. For my own part I see in it more reason to suspect adrenal than thyroid derangement. We shall presently be able to judge what evidence the most recent research furnishes in justification of this suspicion.

But first let us consider, very briefly, some of the known facts regarding the incidence of exophthalmic goitre. It is, so far as I am aware, almost unknown in animals either domesticated or wild. Cases have been reported in dogs, cows, and horses, but these are rare, and their true nature doubtful. Nevertheless, I sometimes wonder whether a study of the highly bred, ridiculously fed lap-dog might not fail to reveal examples of it. Recently, a condition of exophthalmos, with great thyroid enlargement and hyperplasia and loss of weight, developed in one of six pigeons that I had fed for long periods on small daily doses of tyramine, but while the bird had exophthalmos in association with a large hyperplastic thyroid—and, therefore, exophthalmic goitre—I am not prepared to assert that the disease was identical with that occurring in man, nor that it was due to the tyramine administered. The almost complete absence of this malady from animal pathology is a negative fact of much importance, were its cause but known, especially so as thyroidal disease in general is common in domesticated and caged animals. To me it indicates that animals are free of some influence to which highly civilized man is nowadays subjected. Again, exophthalmic goitre is much commoner in females than in males, although the divergence in sex incidence would appear to be less evident in countries where the stress and strain of life is most marked. It is, too, commoner in young women between the ages of 15 and 35 than at other periods of life, and is thus often associated in its origin with the sexual function, an association which is further emphasized by its not infrequent accompaniment in later life with pelvic neoplasms. Has suppressed, excessive, or perverted sexual function or sexual incompatibility anything to do with its onset? In certain cases I have thought that it has. It is most common in improperly nourished young women of the working classes, among many of whom there is a constant struggle between the provision of a sufficient food supply and the demands of personal adornment. Too often their scant earnings are devoted more to the gratification of the latter than of the former. These facts are, however, too general to be of much use to us in the solutions of the problems presented by this malady. What is urgently required is an epidemiological survey of the disease with special reference to thyroidal family history, dietetic history, age, sex, occupation, normal sexual relations, marriage, child-bearing, constipation, gastro-intestinal disorder, previous illnesses, and the like. It is to me extraordinary that so obvious a field of inquiry should for so long have remained unexplored. There is, too, a distinct connexion between various infections and the origin of this disease; while physical, nervous, and mental stress or shock are often determining factors in its onset.

Its race distribution has not been thoroughly worked out, but recently a fact of singular interest in this connexion has come to my knowledge. It is practically unknown among the indigenous inhabitants of India, while they reside within their own country; it is confined almost entirely to the domiciled community in India—to Europeans, to Anglo-Indians, and to Parsees. But despite its rare occurrence amongst Indians who reside in India, cases of exophthalmic goitre were not infrequently encountered in Indian soldiers returning to India from the Western Front during the late war. This fact, taken in conjunction with the high incidence of the disease in western countries, leads me to believe that Graves's disease is pre-eminently a disease of modern civilization, of western modes of life and nutrition, and of the stress and strain and nervous instability which western civilization so often entails.

Reasoning on these lines one turns at once to derangement of the adrenal-sympathetic system for a possible explanation of its genesis, a point to which the earliest, most common, and characteristic symptom of the malady—asthenia—has already directed our thoughts. With this system must be associated the thyroid gland, since, together with the adrenals, it forms part of the endocrine heat-regulating mechanism of the body. Here we begin to find evidence of a more definite order. We know, of course, that Graves's disease is associated with a high metabolic rate and that removal of the thyroid gland will reduce this rate; but almost the whole of the organ must be sacrificed in order effectively to do so. Now by the removal of the thyroid we remove one link in a chain of which the adrenal-sympathetic forms an equally important part; and it is probable that disturbance of this part of the heat-regulating mechanism of the body might be as much concerned in the increased heat production, which is so constant a feature of Graves's disease, as is the disorder of the thyroid. Dr. David Marine (New York) has quite recently provided experimental evidence that this may indeed be the case. He has found that removing or crippling the suprarenals (by freezing *in situ*) results in a metabolic disturbance, characterized by increased heat production and CO_2 output, definitely related to the completeness of removal of the cortical function. The symptom complex somewhat resembles that of exophthalmic goitre. I have had an opportunity to see this work in progress and to examine the suprarenals that had been subjected to freezing; and I find in it a new hope for the more speedy solution of the problems connected with the genesis of Graves's disease. Other observations also are of interest in this connexion. For example, the condition of artificial exophthalmic goitre that can be induced by the anastomosis of the phrenic nerve with the peripheral portion

of the cut cervical sympathetic in the cat (Cannon) is associated with an increase in size of the adrenals; a result which in the light of Marine's experiments suggests an attempt on the part of the adrenal cortex to control the excessive sympathetic excitation brought about by the anastomosis.

It has long been known that both in the simple thyroid hyperplasia due to an insufficient supply of iodine, and in that less benign hyperplasia so frequently associated with Graves's disease, the thyroid gland contains less than the normal amount of iodine per gram of gland substance. But whereas in the former the iodine content of the gland can be restored to normal and the hyperplasia dispersed by the administration of iodine it cannot in the latter. Indeed, the administration of an amount of iodine in exophthalmic goitre that would be sufficient to restore the hyperplastic thyroid of simple goitre to the colloid or resting state would be attended with disastrous results. In the former case the hyperplastic organ is still able to control the metabolism of iodine, in the latter it is not; it cannot utilize iodine nor store it normally. There is in exophthalmic goitre a failure on the part of the thyroid epithelium (as shown by J. Rogers) to perform efficiently its metabolic duty with respect to iodine. Now both the work of Marine and of Rogers seems to indicate that this failure on the part of the thyroid is due in its turn to failure of adrenal-sympathetic control; a failure which may be the result either of adrenal disorder or of impairment of the functional integrity of the thyroid terminals of the sympathetic nerves or of both together. For Rogers has shown that by feeding animals with adrenal nucleo-proteins the thyroid gains from 50 to 75 per cent. or more in its iodine content within a few weeks, and that the integrity of the thyroid terminals of the sympathetic nerves is essential to the success of adrenal feeding.

If, now, this failure on the part of the adrenal-sympathetic system, this loss of the "check" exercised by the adrenal cortex on the thyroid function—the adrenal cortex being, as it were, the hand that holds the sympathetic reins to the thyroid—if this failure be indeed a fundamental factor in the production of the symptom complex of exophthalmic goitre, we begin to realize how it may be that conditions of modern civilization can give rise to it, and why it is that asthenia is one of its earliest symptoms; for at this point my own work on the effects of "faulty food" on the adrenal glands and on the sympathetic nerve elements touches that of Dr. Marine. The adrenals are peculiarly sensitive to imperfections in the diet, especially to deficient supply of vitamins, pronounced changes in the adrenal cortex resulting therefrom. Then, too, the health and stability of the sympathetic nervous tissues are similarly dependent upon a sufficiency of these essential substances. If now we turn to examine the meagre evidence afforded by the incidence of this disease, we find that it is most common in precisely that class so subject to overwork and to imperfect feeding, the young women of the working classes in whom, too, the sexual organs so frequently suffer from improper food supply. Add to this accumulation of causal conditions the attacks of such infections as influenza or the presence of alimentary "toxaemia," which are known to exert a deleterious action on the endocrine system, and the way is made ready for the onset of a malady that needs but shock or exaggerated stress and strain to precipitate it. Such a conception of the genesis of Graves's disease emphasizes the probable importance of a nutritional factor in its causation, and gives us some idea of what we effect when, by rest and good food, we so often relieve or cure those who suffer from it. By rest we conserve the resources of the endocrine regulators of the heat-regulating mechanism—resources that are so easily exhausted by overwork, worry, mental depression, and fear; and by the provision of a vitamin-rich food we tend to restore the exhausted function of the adrenal cortex, to prevent the further deterioration of the nervous tissues, and to avert that proneness to sexual disturbance which is so commonly associated with Graves's disease. Let me emphasize here that there is no more common cause than faulty food of disturbance in function of the endocrine regulators of metabolism; and this being so we must ever look to it as the most likely although, of course, not the only foundation upon which metabolic diseases are built.

In these remarks I have endeavoured to indicate the trend which modern research is taking in regard to this disease, without, however, suggesting that as yet we have passed with certainty any definite sign-posts. But the road to success appears more clearly defined, and it cannot but be the wish of pathologists, physicians, and surgeons alike that research should indicate a more scientific method of dealing with exophthalmic goitre than the surgical sacrifice of an organ so important in the human economy as the thyroid gland. When the reins of control have fallen from the hands of an exhausted driver his horse may bolt, and we may, indeed, effectively stop it by shooting; but it will be admitted that a more economical procedure is to stop the runaway by other means and to restore the exhausted driver.

The chairman, Dr. C. O. Hawthorne, Vice-President of the Section, in summing up the discussion, said that the Section had been fortunate in hearing the views of authorities who spoke on the basis of a wide personal experience. A somewhat remarkable feature of the discussion was the almost entire absence of reference to medicinal treatment. Professor Drummond had said a vigorous word for potassium iodide, but the bromides and such traditional medicines as belladonna and digitalis had been left severely alone. He doubted whether this omission really represented the mind of the profession, though it was possible there was a rebound from therapeutic claims that had been overstated. Another vacant space might be noted—namely, the non-introduction of any proposition concerning the relation of the sympathetic system to the clinical features of exophthalmic goitre. Professor Murray appeared to have disposed of Müller's muscle as an agent causing exophthalmos, and presumably with this disappeared irritation of the sympathetic, so far at least as protrusion of the eyeball was concerned. But while allowing that exophthalmos was due to the accumulation of fat in the orbit, was it not necessary to recognize that not infrequently there was an appearance of protrusion without the reality, as a result of retraction of the upper eyelid? And here, if Müller's muscle was explained away, there remained only contraction of the levator, and for this an explanation was not on the surface.

The opportunity of surgery has been most effectively and judicially stated by Mr. Berry, and it was a word that could not be challenged. Similarly, treatment by *x* rays had its undoubted triumphs; while the methods described by Dr. Wilson had the special attraction that they offered a measured or quantitative estimate of the severity or otherwise of the individual case. At the same time it may be claimed that there are not a few cases which can be judged clinically as slight or moderate examples of the disease, and certainly in these, general and medicinal measures, if combined with patience, could expect a considerable measure of success. He would like to have heard more on this point from those engaged in family practice. On behalf of the Section the chairman offered an expression of thanks to the openers of the debate and to others who had taken part in the discussion.

SECTION OF ANAESTHETICS.

W. J. McCardie, M.B., B.Ch., President.

PRESIDENT'S INTRODUCTORY REMARKS.

The President said: I am deeply conscious of the honour of being chosen as President of this Section and of having as Vice-Presidents and Secretaries fellow anaesthetists of the highest reputation. To Dr. Prescot Fairlie, the senior Honorary Secretary, my and your very best thanks are due for the admirable arrangements he has made for this meeting. It is now twenty-five years since I devoted my attention to anaesthesia, and during that period great and rapid advances have been made in the development of our branch of medical science. I understand that the official training of Glasgow medical students in the administration of anaesthetics is still in the hands of surgeons. This seems to me to be an obsolete practice, and certainly is not in the best interests of the students or, more important still, in that of the patients. Advance in anaesthesia has been as rapid as advance in any other scientific subjects, and it is impossible for surgeons, engrossed as they must be in their own work, to follow, practise, or teach modern developments. On the choice of the anaesthetic and on the method of the administration the life of the patient frequently depends. In the progress of anaesthesia my fellow workers in Glasgow and other parts of Scotland have taken a great and honourable share. The position occupied by the anaesthetists of Great Britain now holds a definite and well-recognized importance. This is the

first time that a meeting of this Section has been held in Scotland, and I venture to think that the present one will be the precursor of many other meetings.

DISCUSSION ON BRONCHO-PULMONARY COMPLICATIONS FOLLOWING OPERATIONS UNDER ANAESTHESIA.

OPENING PAPER

BY

DAVID LAMB, M.B., C.M.,

Late Senior Anaesthetist, Victoria Infirmary, Glasgow.

THIS is the ninetieth Annual Meeting of the British Medical Association, but only the third at which an Anaesthetics Section has been included in the programme of scientific discussions. In 1910 and 1912 discussions on anaesthetics took place at the London and Liverpool meetings respectively, and in October of this year a world congress of anaesthetists will be held under the auspices of the leading societies of anaesthetists of America, at Columbus, Ohio, U.S.A. Anaesthetists, therefore, have reasonable grounds for congratulation on the increasing recognition of the importance of their specialty, both in this country and abroad.

The subject and title of the discussion which I have the honour to introduce were chosen by our President, Dr. W. J. McCardie, and for many reasons I think his choice has been a peculiarly happy one. Out of courtesy to Glasgow it was decided by the committee that a Glasgow anaesthetist should be asked to give the opening paper, and, more out of respect for my advancing years and my lengthy service as anaesthetist to the Victoria Infirmary than on account of any special aptitude for the important task, the honour of doing so has been conferred upon me. I take this opportunity of acknowledging the compliment to Glasgow and to myself.

I have said that the choice of subject is a happy one, and I did so for this reason. The official training of Glasgow students in the administration of anaesthetics differs from that in the great majority of other surgical centres in Scotland and elsewhere in that it still remains in the hands of the surgeons, and special anaesthetists are not yet officially recognized as teachers. One of the results of this arrangement is that, whilst all the expert anaesthetists here use ether freely as well as chloroform, graduates going out into the world from this school know little or nothing of the peace of mind of the anaesthetist engendered by the use of ether. On the contrary, they, or at least those who have come under my observation at the Victoria Infirmary, are, to begin with at least, still under the impression that the administration of ether is frequently, if not usually, followed by bronchitis and pneumonia or cardiac failure, and that whilst occasionally patients die on the table under chloroform, far more die after the operation from the above complications when ether is used. If this discussion makes clear that there is no truth, or only the faintest element of truth, in this teaching, it will not have been held in vain, and the way will be paved for the Glasgow graduate of the future approaching his anaesthetic cases without fear and trembling, and he, as well as his patients, will be spared many alarming moments and a few tragic situations. The number of fatalities occurring annually in this city from chloroform in the hands of comparatively inexperienced anaesthetists would probably surprise, if not startle, the adherents of this old doctrine.

The list of broncho-pulmonary complications which may follow operations under anaesthesia is rather a formidable one, including, as it does, acute or subacute bronchitis, bronchopneumonia (so-called ether pneumonia), lobar pneumonia, pleurisy, empyema, abscess and gangrene of the lung, embolism of the lung with or without infarction, and pulmonary oedema, either congestive or acute. In one case, in which the stump of a tooth had slipped unobserved through the glottis, a condition mistaken for phthisis followed, the diagnosis being cleared up later by radiography. It is for us to estimate approximately the frequency of those complications, to discover the various contributory factors in their causation, and to apportion fairly to each its share of responsibility. Accepted opinion on those points will readily suggest means to be adopted towards their prevention when such is possible. The subject is still further complicated by the fact that nowadays we have not only the inhalation of nitrous oxide, chloroform, and ether to consider, but also that of chloride and bromide of ethyl, local anaesthesia, spinal analgesia, the intratracheal and rectal administration of ether, the intravenous use of ether, hedonal, etc., and the advantage of warm vapours as against that at ordinary temperature.

In a paper limited as this one is by the regulations of the British Medical Association, it is manifestly impossible to discuss every branch of this subject in detail. I would suggest, therefore, as points for discussion the types of broncho-pulmonary complications met with, the frequency of their occurrence and their causation, with which latter is naturally associated the question of prevention.

BRONCHITIS AND PNEUMONIA.

Occasionally a patient is for a few days after operation "chesty." He has a slight cough, with or without expectoration and without pyrexia, the result of mere irritation of the upper air passages or of very slight bronchial catarrh. Mr. Parry first drew my attention to a condition occasionally following operations, more especially urgent abdominal cases, a condition which at first alarmed him but which later on did not give him much concern—a condition with which most surgeons must be familiar. On the day after operation the temperature rises to about 100° F., and the patient complains of slight roughness, tightness, or oppression about the chest. He has a slight cough, which he is compelled to restrain on account of the pain in the abdominal wound, but he never appears to be very seriously ill. The temperature may rise to between 101° and 103° and usually lasts only three or four days, when with the greater ability to cough, mucopurulent expectoration, sometimes very free, takes place, and the condition rapidly subsides, though it may last for several days longer. The cause of this complication, which occurs occasionally apparently without symptoms other than pyrexia (when it is probably vaguely referred to as "post-operative reaction"), has been investigated at the Presbyterian Hospital, New York, by Whipple,[1] who has carried out a good deal of original research work on the radiographic method of studying post-operative pulmonary complications. Those cases seem to be cases of abortive pneumonia, the radiogram showing a distinct shadow, wedge-shaped to begin with, the base towards the pleural surface, and more frequently in the lower lobes of the right lung. Occasionally the shadow is seen a day or two before the development of any physical sign of lung implication, and usually both shadow and physical signs disappear in one to three days. Bronchial breathing may occasionally be absent if the area of consolidation does not extend all the way from the periphery to the neighbourhood of the larger bronchi near the root of the lung. The biological classification of the pneumococcus by means of immunity reactions has established the fact that pneumococci can be divided into at least four groups. Groups I, II, and III may be called parasitic, inasmuch as they do not occur in the throat except pathologically, while group IV may be looked on as saprophytic and is found in at least 60 per cent. of normal throats. According to Whipple, it is now well recognized that as the result of the work of Neufeld and Haendel, elaborated by the investigators at the Rockefeller Institute, groups I, II, and III are the inciting organisms in the severe typical medical pneumonias, and that group IV is the more usual finding in the majority (70 per cent.) of post-operative cases, and especially the shorter atypical forms of the disease referred to above. In the remainder the exciting organisms included the I, II, and III groups of pneumococcus, the *Bacillus influenzae*, a streptococcus, and the *Bacillus mucosus capsulatus*. In an increasingly large number of the patients developing this type of disease there is found pneumococcus IV, both in the pre-operative and in the post-operative sputum. The germs in the mouth and pharynx get mixed up with the excess of mucus and saliva, and infection of the bronchi results—a view which is in support of that of Hölscher on the origin of those complications. In Whipple's cases lobular pneumonia was from two to three times more frequent than lobar. In addition to this comparatively mild complication all the ordinary forms of pneumonia and bronchopneumonia may be met with, the exciting organisms being those referred to above, though the great majority of the later pneumonias are septic in origin.

Frequency.

Most of the older statistics available are of little real value, as from the extreme divergence of their findings they can hardly be looked upon as reliable. They do not distinguish

between minor and major operations, nor do they differentiate between clean and septic cases. One must remember also that when any pulmonary complications follow ether they are usually at once described as ether pneumonias, but if after chloroform they are ascribed to some other cause. Discussions on this question were held by the Society of Anaesthetists in 1900 and 1903, and the results are recorded in their *Transactions* (vols. iii, iv, and v). Extremely varied opinions were expressed by the leading anaesthetists of London.

Co ner and Crouch[2] gave an interesting report based on close personal observation of 2,400 patients at St. Thomas's Hospital. Ten cases (one fatal) to whom ether had been given developed temperatures with respiratory trouble within twenty-four hours. Practically all occurred after long operations, especially those in which free expectoration was interfered with by bandages or the position of the patient, and they included 4 cases of hernia, 2 breast cases, and one case of varicose veins. In none of the cases was the anaesthetic administered by the staff anaesthetists, this being done by the less experienced house officers.

Smith, of Liverpool,[3] in 221 major operations with warmed ether and chloroform and 220 minor vaginal operations with open ether, gave a morbidity of 7.5 per cent. in major and 2.2 per cent. in minor operations. The great majority were coughs without physical signs, the remainder, 1.1 per cent., being cases of bronchopneumonia.

Alma Vedin,[4] of New York Hospital, gives a review of 7,900 operations. There were 120 post-operative pulmonary complications, or 1.51 per cent. These complications comprised lobar pneumonia, bronchopneumonia, acute bronchitis, pleurisy (acute fibrinous, sero-fibrinous, and suppurative), and embolism of the pulmonary artery. There were 29 deaths in these 120 cases, including 10 deaths from pulmonary embolism, a total mortality of 0.36 per cent. of the 7,900 operations. Lobar pneumonia was by far the most frequent complication; nearly all cases followed abdominal operation, and the incidence was relatively greater after operation in the upper abdomen, though several followed appendicectomy (19 per cent.) and hernial repair (33 per cent.). The anaesthetic used was ether alone or preceded by gas or ethyl chloride, except one case with gas oxygen and one with no anaesthetic.

Whipple[1] reported 97 cases of pulmonary complications in 3,719 carefully observed post-operative cases (2.6 per cent.) in 1915 and 1916. In his opinion general statistics regarding the incidence of this complication in different clinics vary largely with the care given to its detection. He gives a table of reports by nine different observers in which the morbidity detected in coeliotomies varied from 0.5 to 8 per cent.

Causation.

Comparatively early in my experience at the Victoria Infirmary I investigated five cases of lobar pneumonia following operation. I found that at the time of operation four were suffering from "colds in the head," and the fifth had recently recovered from influenza. Two had chloroform only and three C_2E_3 and chloroform. At that time patients on the operating table were covered only by a sterilized sheet, and were brought from and returned to the ward with a "theatre blanket" as practically their only covering. Since then, with the exception of one case (my one fatal case, to which I shall refer later), I think the surgeons will support me when I say that there has been extremely little pulmonary trouble attributable to the anaesthetic, a statement borne out by the records of the *post-mortem* room. The fact that the Victoria Infirmary is ventilated by the Plenum system, and that there are no cold corridors or open windows, is perhaps worthy of note. C_2E_3 was the anaesthetic of choice until 1910, as—brought up as it were on chloroform—Clover's apparatus in the pre-atropine days, with its cyanosis, excessive mucus and saliva, never appealed to me. Afterwards open ether or chloroform were the routine agents, with the various special methods when the use of these was indicated.

By the courtesy of Dr. Anderson, our pathologist at the Victoria Infirmary, I have been able to analyse the reports of 1,031 consecutive *post-mortem* examinations from the surgical wards. I was much impressed by the large number (fully 70 per cent.) of patients who showed evidence of chronic bronchitis and emphysema, pleuritic adhesions sometimes very extensive, or other indications of past or chronic lung mischief. In a large proportion also passive congestion—in three cases definite hypostatic pneumonia—and oedema of the lungs were apparently terminal features of the cases. In this series there were:

7 cases of pneumonia following accidents—no operation.
5 cases (acute bronchitis 3, pneumonia 1, double pleurisy 1) in other surgical conditions without operation.
24 septic pneumonias in cases of osteomyelitis, peritonitis following operations for perforated gastric or duodenal ulcer, gangrenous appendix or gall-bladder cases, cellulitis, prostatectomy with pyelitis, etc.
6 others in cases without evidence of sepsis: 2 pylorectomies for malignant disease and 1 excision of malignant gastric ulcer, all in patients already weak and emaciated; 2 strangulated hernias in patients aged 64 and 70; 1 colostomy for cancer of the colon in a patient aged 76.

In the 24 septic cases the pneumonias were definitely septic in origin, the infective organisms having attacked the lungs from the infected blood stream. In the last group, when one considers the condition of the patient, the clinical history, and the nature of the case generally, the part played by the anaesthetic must have been infinitesimal, so that, so far as fatalities are concerned, the anaesthetic comes out of the inquiry practically "without a stain on its character." When a surgeon tells you that his patient died of bronchopneumonia ten days after operation and that you should have given chloroform instead of ether do not worry too much. There may have been another explanation. Incidentally I might mention that in this series of *post-mortem* examinations not a single case showed any evidence of delayed chloroform poisoning, although Dr. Anderson was always on the look-out for it.

Although more intimately connected with a later part of this paper I shall just enumerate the other pulmonary complications found in this series. There were 8 empyemas, 15 pyemic abscesses of the lung (7 gangrenous), 16 infarctions, and in addition there were 10 cases of thrombosis (in the iliac, femoral, portal, renal, and pulmonary veins and inferior vena cava). All were associated with grossly septic conditions except two cases of thrombosis and two infarctions, the latter after operations for inguinal hernia and varicose veins, the former after operation for varicose veins and excision of the kidney for malignant disease.

From the experience referred to previously I became strongly of opinion that the most important contributory cause of early post-operative pulmonary trouble was the presence of some more or less recent catarrhal affection, mild or otherwise, of the upper air passages of the patient prior to the operation. In this connexion I would point out also that the presence in the operating theatre for any length of time of any individual suffering from an acute nasal catarrh is, unless he is well masked, a danger to the patient and to all others present. On several occasions I have seen a "cold" run through a whole theatre staff, the affection being traceable to such a cause. The factor next in importance is undue exposure to cold and consequent "chill."

According to the textbooks the usual causes of ordinary bronchitis and pneumonia are chill and exposure, which, by lowering the vitality of the tissues, render them more liable to the attacks of the ubiquitous pneumococcus, etc. All the circumstances of an operation lend themselves to possible chill and exposure *unless constant care and watchfulness are exercised.* There may be unnecessary exposure during the preparation (shaving, bathing, etc.) prior to the operation, the patient actually catching cold after his admission to the hospital or nursing home. An inexperienced nurse may bring him, insufficiently covered, along cold corridors to wait some time in the anaesthetic room. In the theatre, the temperature of which may not always be all that could be desired, he may be exposed for an hour or two on the operating table with the abdominal contents or an extensive wound exposed. Then comes the return to the ward along draughty corridors, or, as I have seen even in this country, along an open veranda, into a room insufficiently heated or with widely opened windows regardless of the weather. The wonder is not that pulmonary complications arise, but that they do not arise more frequently. All this tends to lower the temperature of the patient and aggravates the fall which frequently occurs during a long and severe operation, and thus the patient's vitality and resistance, possibly already reduced by disease, starvation, loss of blood, or shock, are still further impaired.

By far the majority of post-operative pneumonias, more especially those occurring several days after the operation, are associated with sepsis, the infective organism being carried to the lungs free in the blood, or by the lymphatics

from some septic area, or in an embolus from an infected thrombus. Anything tending to cause limitation of the respiratory movements and consequent tendency to congestion of the lungs constitutes another contributory factor, and here the pain of an abdominal wound and tight bandaging round the chest or abdomen are the most common influences at work. The remedy for the latter readily suggests itself, whilst for the former some surgeons favour the local use of quinine and urea hydrochloride either at the beginning or the end of the operation. Congestion of the lungs may also occur as the result of circulatory depression from the toxic effect of the anaesthetic, chloroform being the most dangerous on account of its depressant action on the heart and blood vessels.

Then we have the class of cases described as "aspiration" pneumonia or bronchitis, in which, usually in "obstruction" cases, but also possibly during the recovery from the anaesthetic before the complete return of the reflexes, vomited material or blood is sucked into the lungs. In this class may be included those cases in which there is hypersecretion of mucus and saliva, which become saturated with the anaesthetic and which may act as a vehicle for the conveyance of organisms from the mouth downwards. This, however, thanks to the routine use of atropine, is now rarely troublesome. Cases have been ascribed also to the irritant effect of impurities in the anaesthetic. At a meeting of the Scottish Society of Anaesthetists one member referred to an outbreak of pulmonary complications due to the use of commercial ether, supplied, unknown to the anaesthetist, by the chemist with a view to economy.

What, then, is the part played by the anaesthetic in the causation of the complication under consideration? In this country opinions vary, but it is, I think, generally accepted that nitrous oxide gas is non-irritant and that the vapour of chloroform is much less so than that of ether, whether warmed or at the ordinary temperature. The consensus of opinion seems to be that it is only the prolonged exhibition, more especially of concentrated vapour of ether, which gives rise by direct irritation, or by chilling due to evaporation, to any real danger. This also was the general opinion at the discussion on ether pneumonia by the Society of Anaesthetists in 1900. Shipway,[5] however, expresses the opinion that—

"Ether, when given by modern methods (warmed vapour), is known to be capable of sustaining the blood pressure over long periods, and to have rid itself of its former reputation of setting up irritation of the lungs."

Abroad, also, opinions differ on this point. Flagg,[6] of New York, in a personal communication, says:

"The theory that ether *per se* gives rise to an irritation which leads to post-operative pneumonic complications appears to have been abandoned as untenable. It is a quite genuinely accepted fact in the circles wherein I work that there is no such thing as ether pneumonia, that the post-operative pneumonia which we see is due to exposure before, during, or after operation, the development of an infection already present or of embolic origin. In operations on the nose or throat a certain number of cases probably occur through aspiration, when suction is not employed."

He finds that there are definite seasonal occurrences of pneumonic complications, and refers to a series traced to a single ward notoriously draughty and old-fashioned in its appointments.

Mikulicz[7] (quoted by Rovsing[8]) had, on account of the somewhat frequent occurrence of post-operative pneumonia, deserted ether for chloroform, in the belief that the pneumonia was due to the irritating effect of ether. To his surprise, however, he met then with a still greater percentage of post-operative pneumonia. He changed to local anaesthesia in all cases, and to his still greater surprise found that lung complications increased instead of decreased (27 cases in 114 laparotomies). Naturally this experience overthrew the conception that post-operative pneumonia was "narcosis" pneumonia. The great majority followed abdominal operations. According to Mikulicz also it has been proved experimentally with animals, and he has substantiated the facts by experiments, that whilst ether occasions increased salivation, the air passages—larynx, trachea, and bronchi—are not irritated at all, even when the animals were killed by administering ether through a tracheotomy tube. According to Whipple, on the other hand, "there is no doubt that ether is the anaesthetic most irritating to the mucous membranes of the oropharynx, particularly when there is any acute or chronic inflammation at the time it is administered."

From repeated personal experience I know that if I am just recovering from a nasal or bronchial catarrh any attempt to administer ether to a patient by the open method, involving, as it does, my inhaling some of the vapour, soon sets up very troublesome cough and increased secretion of mucus or muco-pus, which seems to come from below the glottis. When using chloroform or Shipway's apparatus, with which there is less contamination of the atmosphere of the theatre, the same effect is evident, but much less marked. When I am perfectly free of catarrhal symptoms no such effect is produced. I always look upon this as due to the irritant effect of ether vapour acting on the mucous membrane of my upper air passages, which at the time is in a specially susceptible condition.

Recently in a nursing home I anaesthetized a gentleman about 50 years of age, for operation for double inguinal hernia. There was considerable excitement during the induction of anaesthesia, which was effected by means of chloroform followed by open ether, but as there was a somewhat free secretion of mucus and saliva, in spite of the use of atropine, the latter part of the operation was completed under chloroform. Within four or five hours a condition resembling acute oedema of the lungs was present. This continued next day, and the patient died within forty-eight hours with severe dyspnoea and excessive muco-purulent expectoration. On investigation it was found that the patient was probably alcoholic, that a year before he had suffered from a prolonged attack of bronchopneumonia, and that he had just recovered from a "severe cold" a week prior to the operation. There was no albuminuria. Unfortunately there was no *post-mortem* examination, but I cannot absolve the irritant action of the anaesthetic from at least a share in the catastrophe.

It seems to me that the vapour of ether, and of chloroform to a very much less degree, is certainly an irritant to the lining membrane of the upper air passages and bronchi, but extremely rarely sufficiently so—unless unskilfully administered—to set up a purely irritant bronchitis or bronchopneumonia similar to that caused by the poison gases during the late war. But where there is any weakening of the resistance of those tissues, the result it may be of congestion due to chill or lowered vitality, or to the presence of a mild catarrhal condition, or to a combination of those conditions, this comparatively mild irritant action, more especially of ether, may act as the "last straw" and lead to the overwhelming of the natural antibodies by the ever-present pathological organism which the healthy tissues are under ordinary circumstances able to resist.

Whilst, therefore, it may be correct to say that the anaesthetic *per se* rarely if ever sets up a bronchitis or bronchopneumonia, it is wrong to maintain that it is always a perfectly innocent agent in all such cases after operation. One would naturally expect the use of warmed ether by Shipway's or other apparatus to be even less harmful, but when one considers the extreme variations of temperature with which the mucous membranes of the air passages frequently contend in everyday life without harm resulting, one does not feel inclined to press this point unduly. I hope, however, to hear some evidence on this point from some of the members present. The same remark applies to the use of ethanesal.

It is not only the direct effect of inhalation that we have to consider, but also the effect during excretion, the great bulk of which takes place through the lungs. I know of one case in which one pint of saline containing 5 per cent. ether was administered to a youth intravenously, and in which acute oedema of the lungs occurred within a few hours. A case[9] has been described also, in which ether was administered per rectum to a gentleman of 58 with malignant disease of the larynx, which quickly proved fatal with signs of excessive irritation not only of the intestine but also of the bronchial mucous membrane.

In support of the view that the great majority of post-operative pulmonary complications may and do occur quite independently of the anaesthetic, it is found that such cases also occur after operations under local anaesthesia and spinal analgesia. I have not seen this occur, but my experience is comparatively limited. One must remember, however, that those methods are frequently reserved for cases in which pulmonary troubles are present or anticipated. Rood,[10] however, with a personal experience of 8,000 cases, states that he has seen both bronchitis and pneumonia follow the use of local anaesthesia. Acute septic conditions, such as appendicitis and osteomyelitis, were generally present in those cases in which pneumonia followed the use of stovaine. Whipple[1] records also six cases under local anaesthesia with novocain two of them being in cases giving a history of recent recurrent colds.

So far I have dealt with catarrhal and pneumonic conditions, and have still to refer to some of the other post-operative pulmonary complications, the majority of which, in my experience, are associated with sepsis.

Pleurisy, Empyema, and Abscess of the Lung (frequently Gangrenous).

These complications are usually associated with sub-diaphragmatic abscesses connected with septic gall bladder or appendix cases, perforated ulcers of the stomach or duodenum, malignant growths in the upper abdomen, or they originate as the result of embolism from other septic areas, whilst cases of acute oedema of the lungs are, according to Buxton,[11] usually associated with some pathological condition of the kidneys. In some of the Victoria Infirmary cases of empyema and abscess of the lung associated with abscesses in the upper abdomen there was a definite perforation of the diaphragm, admitting a thick probe, whilst in others there was no perforation, the septic process having permeated the tissue of the diaphragm throughout its entire thickness. In others, again, the extension had taken place by way of the lymphatics. Abscess of the lung is of occasional occurrence also after tonsillectomy, though rarely after other operations, even when extensive, in the mouth and throat. Brown Kelly,[12] at Newcastle last year, described one such case after tonsillectomy, and referred to a considerable number of others. He quoted two explanations which have been given of this occurrence:

1. Aspiration of blood containing septic matter squeezed out of the tonsillar crypts during operation. This view is supported by the following facts. Almost all were operated upon under general anaesthesia whilst lying on the back (Gwathmey has collected four cases under local anaesthesia); in the majority signs and symptoms developed within thirty-six hours, the abscess was solitary, and, as a rule, in the lower or middle lobes of the right lung.
2. According to the other view, septic thrombosis of the veins in the tonsillar bed is followed by pulmonary infarction. This explanation accounts for the minority of cases (Gwathmey, 1 per cent.) in which there is no trouble until after the lapse of from four days to two weeks.

Pulmonary Embolism and Infarction.[13]

These complications occur probably much more frequently than is generally supposed, and the great majority are met with in patients over 45 years of age, and usually after abdominal operations. The site of thrombosis has been found to vary, but usually it is in the iliac or femoral veins or in the inferior vena cava. The conditions predisposing to thrombosis are loss of fluid from starvation, purging, haemorrhage, post-anaesthetic vomiting, etc., sluggish circulation due to shock or anaemia, the more or less fixed recumbent position, damage to vessels, or to sepsis. The time of occurrence is most commonly from five to ten or twenty days after operation. In one series in the Mayo clinic 19 took place in the first week and 21 in the second. With regard to frequency, Lockhart-Mummery quoted 47 fatal cases of embolism in 63,573 cases in the Mayo clinic (36 pulmonary, 10 cerebral, and 1 coronary). Victor Bonney recorded 5 cases in 1,791 hysterectomies, and 2 in 1,410 ovarian and tubal operations, whilst there were none in ventrofixation or vaginal cases, and he remarked upon the relative frequency after uterine operations. Spilsbury found 9 deaths from pulmonary embolism in 1,013 consecutive *post-mortem* examinations at St. Bartholomew's Hospital. In Johns Hopkins Hospital there were 31 deaths in 21,000 cases, but as Lockhart-Mummery estimates that probably only 1 in 10 cases is fatal this complication is not a rare one.

Blocking of the pulmonary artery by a large embolus, leading to sudden death before there is time for the formation of an infarction, occurs usually in patients who have had an otherwise normal convalescence. In cases of infarction due to small emboli a low grade of inflammation in connexion with the wound or with phlebitis usually precedes the onset and the convalescence has not been quite satisfactory (Gordon Watson).

Prevention.

If the various factors to which I have referred are admitted to be the exciting or contributory causes of post-operative pulmonary complications, measures for their prevention will readily suggest themselves. I shall merely enumerate those which in my opinion are the most important.

1. An experienced anaesthetist should be employed, as he is more likely to avoid the use of a too concentrated vapour and the administration of ether in cases in which its use, prolonged or otherwise, is contraindicated.
2. Give atropine sulphate an hour before operation in all cases.
3. If there are any symptoms or signs of nasal or bronchial catarrh, postpone the operation if at all possible. If this cannot be done, or if there is only a history of a recent cold or influenza, carry through the operation as quickly and as gently as possible, and take every precaution to prevent chilling before, during, or after the operation. In all such cases use local anaesthesia or spinal analgesia when possible, otherwise give chloroform, or nitrous oxide and oxygen if absolute and continuous relaxation is not essential. Unless specially indicated avoid the use of ether in such cases. Chloroform in the hands of experienced administrators, though not so safe as ether, is not nearly so virulent a poison as it is alleged to be by some American writers.
4. In abdominal and breast cases apply bandages lightly. Raise the head of the bed as early as possible and encourage the patient to clear away any mucus which may be present in his air passages.
5. In all cases have the patient carefully and continuously watched during his transit to bed and afterwards until his reflexes have returned sufficiently to prevent aspiration of vomited material into the trachea.
6. In operations on the upper air passages take every precaution to prevent, both during and immediately after the operation, aspiration into the trachea of any foreign material such as blood, mucus, or pus, and in dental cases let every stump be accounted for. In all such cases the patient on his return to bed should be turned well round on his side until his reflexes have returned, to allow the escape of blood from the mouth by the action of gravity.
7. Unless absolutely necessary, do not, on a cold winter night, rush an acute appendix case out of his warm bed on his way to nursing home or hospital. The staff are tired, and therefore not so efficient, and the theatre and corridors probably cold.
8. When indicated, as in intestinal obstruction and some cases of peritonitis with vomiting, have the stomach washed out, preferably prior to the administration of the anaesthetic, but certainly before the operation is begun, and repeat the process during the operation if necessary.

In closing this paper, gentlemen, I would put forward the suggestion that one or more subjects for discussion next year should be decided upon at this meeting, that a questionnaire be drawn up by our president and secretary at their convenience, and that this should be circulated to anaesthetists at the principal surgical centres of this country. This close, personal, well-directed observation by a moderate number of anaesthetists even for six months would result in the accumulation of a valuable store of reliable, up-to-date information.

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DISCUSSION.

Dr. Dickinson Berry (London) was inclined to believe that "ether bronchitis" was somewhat of a myth. The anaesthetic was always open to blame for such an accident, "*car les absents ont toujours tort.*" In order to prove that the anaesthetic was the primary cause of post-operative chest trouble the possibility of sepsis connected with the wound must be eliminated, as well as the chance of chill or other infection. In her own experience as anaesthetist to two large hospitals she could recall no case of chest trouble directly attributable to the anaesthetic. She produced statistics of 1,411 cases of thyroidectomy operated upon by Mr. Berry in which careful notes had been kept of the post-operative condition. The anaesthetic used had altered with time: from 1888 to 1907 it had been almost exclusively chloroform; from 1908 to 1912 open ether preceded by chloroform had been mainly used; and after 1912 ether alone by the open method had been the sole anaesthetic in 600 cases. Among the 1,411 cases there were also 47 cases of local anaesthesia by novocain. Only 6 cases were found in which there was mention of lung or throat trouble: (1) Slight pneumonia accompanied by local sepsis, the wound being reopened on the fifth day. (2) Bronchitis for a few days after operation in a lady who had been subject to bronchitis before; primary union occurred. In both these cases the anaesthetic was chloroform. (3) A case of bad dyspnoea; bronchitis, present before, considerably aggravated after operation. Local anaesthetic, preceded by chloroform. (4) Slight bronchitis, clearing up in a few days; primary union of wound. Anaesthetic—ether, preceded by chloroform. (5) Mild sepsis, slight bronchopneumonia occurring on the sixth day in a pregnant woman with urgent dyspnoea, whose temperature was 100° before the operation. Anaesthetic—open ether. (6) In this case the ether appeared sedative;

rapid general improvement immediately followed operation in a patient with râles all over the chest at the time of operation. Twenty-one cases of intratracheal ether at the Royal Free Hospital for thyroidectomies for other surgeons were also cited. In these there were five cases where sore throat and cough were noted; one of these led to septic tonsillitis and another had signs in the chest and pyrexia lasting for a week. Doubtless in these cases the cause of the trouble was irritation or sepsis due to the passage of the tube. In conclusion the speaker held that though chest trouble was probably rarely due to the irritation of the anaesthetic vapour, this latter might reasonably be a contributory factor, either by facilitating the sucking in of septic matter, as when there is much secretion of mucus, or by producing diminished resistance in the patient to outside influences. From this point of view chloroform was likely to be more deleterious than ether, being as a rule more depressing, and it was open to question whether severe operations under a local anaesthetic did not at times produce a more depressed condition than if general anaesthesia had been used. Dr. Berry believed that in connexion with after-effects it was very important to maintain as light an anaesthesia as was compatible with operation.

Dr. A. L. FLEMMING (Bristol) drew attention to, and criticized the use of, strong solutions of cocaine in laryngeal surgery. There was increased risk of aspiration of septic material into the lungs when the laryngeal reflex was abolished by the use of strong solutions of drugs of the cocaine type. He also made a plea for the anaesthetist to be called in and consulted in cases where complications occurred which could be in any way attributed to the anaesthetic. Such complications were frequently aggravated by the injudicious use made of strong expectorants of the type of ammonium carbonate. Their exhibition resulted in the patient being drowned in his own lung secretions instead of relieved. He believed that many complications could be avoided by attention to posture of the patient after operation and during recovery.

Dr. PATON BOYD (Glasgow) remarked on the frequency of pulmonary complications in high abdominal operations, especially those on the gall bladder. He believed that there was a type of "chesty" individual who was especially susceptible to "chesty" conditions, and even chloroform would not help in this type of case. There was also a tendency for complications to occur in runs, and the explanation of this phenomenon was to be sought for in external conditions such as draughty corridors or catarrhal epidemics.

Mr. HERBERT J. PATERSON (London), speaking as an operating surgeon, declared that any person using chloroform without sufficient reason should be criminally prosecuted. Gas and oxygen should be used for abdominal operations, even at the expense of the surgeon in the matter of discomfort and increased operative difficulty due to increased rigidity, and he personally made much use of this anaesthetic even for severe abdominal cases. He believed that a time would come when only urgent operations would be performed in cities and that this was the ideal to aim at. Hospitals should be erected in the open country and only casualty clearing stations left in the towns. Lung complications could be minimized by proper deep-breathing exercises, and these should be undertaken both prior to and following operation.

Dr. H. FEATHERSTONE (Birmingham) presented an analysis of 313 consecutive medical and surgical *post-mortem* examinations made at the Birmingham General Hospital, the results throwing some light on the causation of broncho-pulmonary conditions following operations. The hospital in which all cases were operated upon was ventilated by the Plenum system. Of 135 post-operative autopsies 62, or 45 per cent., had definite bronchopneumonia, whilst of 144 non-operative cases, excluding primary medical pneumonias, 42, or 29 per cent., showed this complication. He concluded that pneumonia was a frequent terminal condition, but was much more common in severe post-operative conditions than in similar "medical" cases. Professor Shaw Dunn, by whose kind permission the analysis was undertaken, believed that the majority of surgical cases showed evidence of aspiration pneumonia. In 50 per cent. of the post-operative cases the lower lobes only were affected, whereas of the non-operative cases only 20 per cent. showed affection of the lower lobes alone—that was to say, most severe operations have a specially injurious effect on the lower lobes. The anaesthetics employed in the cases were: open or closed ether in 21 (33 per cent.); mixture (E_2C_1) or chloroform in 33 (50 per cent.); local or spinal in 4 (7 per cent.); N_2O and O_2 in 3 (5 per cent.); intratracheal ether in one. It was noteworthy that in a hospital where ether was given as a routine, in only one-third of those cases of bronchopneumonia was it employed, while chloroform or a mixture was used in half the cases. Each of the post-operative cases in which bronchopneumonia was found at autopsy had sustained at least one of the five sources of severe shock and exhaustion—namely, septicaemia, embolism, upper abdominal operations, severe general peritoneal shock, or aspiration of septic material from nose and throat. Septicaemia was present in 20 cases (32 per cent.); non-infective thrombosis and embolism in 2 (3 per cent.); upper abdominal operation in 28 (45 per cent.); severe general peritoneal shock in 11 (15 per cent.), including appendicitis and general peritonitis in 7, volvulus in 2, radical carcinoma recti operations with some degree of septicaemia in 2; aspiration of putrid mouth and nose contents after operation for malignant growth of the tongue, jaws, or nose in 3 (5 per cent.) (but in this connexion it must be noted that in over fifty consecutive operations of greater or less severity on the nose and mouth, performed with the patient sitting in a chair, intratracheal methods have abrogated aspiration pneumonia, the cough reflex being always allowed to return before removing the catheter). He wished to emphasize his opinion that ether, even though given cold and concentrated, played but little part in the causation of bronchopneumonia. In the ear and throat department of the hospital, 690 consecutive operations were performed, and with few exceptions the anaesthetic was ether, administered by Rood's intensive method; and no case developed any trouble of such severity as to be recorded. In the gynaecological department operations were prolonged, anaesthesia deep, and haemorrhage sometimes severe, but there was rarely any considerable upper abdominal shock, sepsis was uncommon, and owing to the Trendelenburg position aspiration of oral contents was prevented. In 262 operations only 3 cases of bronchopneumonia occurred. One commenced four days after operation in an old and feeble woman, one was well established before operation in a case of severe upper peritoneal shock due to ruptured tubal gestation, a spinal anaesthetic being employed. The third had profuse lung secretion during the recovery stage, which presumably led to lung infection from a long-standing purulent nasal discharge. It was in the surgical abdominal wards that lung sequelae might be expected, and it was there that they were found. Of 62 bronchopneumonia autopsies 28, or nearly 50 per cent., had undergone operations on the upper abdomen. Harmful reflexes from the peritoneum of that region might produce spasm of the bronchioles or might give rise to paralysis of the diaphragm with collapse of the lower lobes of the lungs. That the diaphragm was at fault might be demonstrated by radiography. Further, pain in the wound might prevent coughing to clear the lungs. Such patients were often poorly nourished owing to some wasting disease (for example, gastric ulcer or new growth), sustained severe peritoneal shock, their diaphragms were relaxed, blood loss might be severe, chill from body exposure might occur, and so general resistance to infection was very low. All that was necessary to ensure a bronchopneumonia was a suitable infective organism, especially in certain surroundings and at special seasons. In summer, and in well-warmed private rooms, respiratory complications were rare, even in exhausted and shocked patients, but they were much more common in crowded hospital wards in the seasons of colds. In March of this year 6 cases of bronchopneumonia occurred in the abdominal wards, while only 2 cases were noted during the following three months. In conclusion, he briefly summed up the predisposing factors which he believed he had shown to lead to lung complications.

In the unavoidable absence of Dr. J. STUART ROSS (Edinburgh) his analysis of 484 cases completed during the first year of his war service in the Balkans was read by the local honorary secretary, Dr. FAIRLIE. Notes of the cases had been carefully kept with a view to elucidating the causation of the sequelae of ether and chloroform.

The series did not include any nitrous oxide cases. All were males, mostly young, many were heavy cigarette smokers, some were in a gravely septic condition, and a large number of them had chronic naso-pharyngeal catarrh. All these factors made for a high post-operative morbidity rate from bronchitis or pneumonia. There were but few cases of abdominal surgery, and in the whole series definite

respiratory sequelae occurred in but 21, giving a morbidity rate of 4.3 per cent., which was curiously near the figure given by Smith in the paper quoted by Dr. Lamb, though Smith stated that the rate was only 2.2 per cent. among non-abdominal cases and 7.5 per cent. among abdominal ones. This therefore meant that the rate was roughly twice as high in his (Dr. Ross's) cases, as most were non-abdominal. In the 21 cases mentioned, 3 were lobar pneumonia, of which 1 was fatal. The last was a man in a gravely septic condition from a gunshot wound of the arm and thigh, and pneumonia developed forty-eight hours after leaving the theatre. The anaesthetic was chloroform and ether from a Shipway machine; the administration was for twenty minutes only, and during administration no warning symptoms of respiratory irritation appeared. If this was a true post-anaesthetic pneumonia and not a septic one, the total mortality rate was therefore 0.2 per cent. in the series. Nearly all the cases received a preliminary dose of morphine and atropine, but in many cases it was administered so near to the operation that time was not sufficient for it to develop its beneficent action. In 125 cases the anaesthetic was chloroform mainly or solely. In 295, ether was used mainly or solely. In 64, a mixture of the two was given intentionally. An open drop method was used in 158 cases, and a Shipway in the remaining 326. Of the 21 cases with respiratory sequelae, 10 had received chloroform, 7 ether, and 4 a mixture.

From these figures it might be argued that chloroform was twice as likely to cause sequelae as ether, but then it must be remembered that in all cases where sequelae were feared chloroform was chosen. The proper conclusion to draw was therefore that chloroform would not necessarily avert sequelae where post-operative trouble was feared.

In the series under discussion the warmed vapour cases bore to the open drop method cases a relation of very nearly 2 to 1. Among the cases where pulmonary complications occurred the relation was 16 to 5, or nearly 3 to 1, so that the protection afforded by warming vapours was not absolute. Note was taken of any bronchial or tracheal mucous râles appearing during administration to a degree more than trifling, and this occurred in 49 cases, in spite of adequate "morphatropinization," and showed the high average irritability of the respiratory mucous membranes of the serving soldier. These 49 cases yielded 4 of the total 21 respiratory sequelae, indicating that mucous râles appearing during anaesthesia indicated about a doubled chance of trouble afterwards, though such troubles developed even when no irritation was shown. In 52 of the cases there was either acute naso-pharyngeal catarrh or definite tracheitis or bronchitis present before operation, and this factor was really pathogenic, for among them no less than 11 developed quite marked trouble afterwards, and quite half of the 21 cases with sequelae had some infection before operation. In the writer's opinion this was cause and effect. Most of the cases showed little more than a slight cold in the head at the time of operation, and it was not the cases with definite bronchitis which gave most trouble later. Such men have already manufactured their antibodies, in all probability. The last etiological factor to consider was that of season, and sequelae were very largely a question of season. From February to the end of April, 5 cases occurred. From May to the end of July only 2 were noticed, one of which was definitely septic in origin. During September, October, and November, 3 cases occurred, and from the middle of December to the end of the following February no less than 11 cases, a state of affairs that was not stemmed even by the total abandonment of ether. The writer did not think that this epidemic was due to supplies of faulty anaesthetic drugs, but to the influence of the season on men debilitated by the hot summer through which they had previously served. He felt strongly that operation should only be undertaken in cases suffering from recent catarrhal infection when the emergency was great, and that all cases should as far as possible be submitted to a proper course of treatment before inhaling any anaesthetic. Colds in the head had formerly been taken much too lightly. Lastly, he thought that the time had now come when anaesthetists should refuse to take all the blame and odium of a post-operative pneumonia.

Dr. K. B. PINSON (Manchester) submitted a statistical survey of cases of which he had kept accurate records from January 1st, 1918, to June 30th, 1922, in order that an equal number of cold and warm months should be included in the period under review, and found two striking facts: (1) how often patients with chest trouble came through the ordeal none the worse, and (2) how often, when complications occurred, they did so within twenty-four hours. His cases numbered 4,180, and serious complications occurred in 56 of these, 24 of pneumonia and 32 of bronchitis or minor complications, giving a total incidence of 1.34 per cent. He was willing to add one-third to these figures to allow for minor complications which had been missed and so to bring up the incidence to 1.8 per cent. In these cases he thought that 10 per cent. could not in any way be considered due to the anaesthetic. The ratio of pneumonia to bronchitis was high, but this was due to the fact that no account was taken of cases in which the cough or tightness of the chest was trifling. The ratio would be altered considerably if these minor cases were taken into account.

Nature of operation: The longer operations showed the highest incidence and also those in which the peritoneal cavity was opened, for whereas 35 per cent. of cases were abdominal, 75 per cent. of chest complications occurred in abdominal cases. Operations with unfavourable prognosis in respect of complications were: umbilical herniae in stout patients, partial gastrectomy, and prostatectomy.

Length of operation: The average length of administration in these 56 cases was forty-seven minutes.

Sex: Male, 32; female, 24.

Age: An unduly high figure was noticeable for the decade 61 to 70 years.

Time of year: 26 occurred in the warm and 30 in the cold weather.

Condition of patient: The results here were interesting, for it appeared that of the 56 cases, 4 occurred in the winter of 1919, when there was much bronchitis and influenzal pneumonia about, 17 were coughing or had bronchitis or a cold or were asthmatic at the time of operation, or had had pneumonia a little time before. In addition, 9 were in poor condition due to alcohol, jaundice, debility, etc. Of the 24 pneumonia cases 10 had definite chest trouble, while 2 of these had had previous pneumonia. Ten of the pneumonia cases died, and of these 9 died from the lung condition; in other words, 9 out of 4,180, or 0.215 per cent. Of these 9 deaths he believed that 4 were due to the anaesthetic mainly. One had had a spinal anaesthetic, and another had only been given gas and oxygen.

He believed that the following conclusions were justifiable: (1) A most important factor in obtaining a good recovery was the judicious choice of the agent and method used. (2) Any method of giving ether which involved rebreathing or caused deep breathing at any stage was to be avoided, since prolonged panting, coupled often with previous morphinization, tends to leave the patient in a torpid state, almost apnoeic, and liable so to infection of the lung. For this reason, after using it for a year in all cases, he had now given up prolonged administration of gas and oxygen except in those cases in which he had reason to expect that no ether would have to be added. The source of ether in all the cases analysed was his "bomb" apparatus.

Dr. H. PINTO-LEITE (London) stated that as the result of his experience in hospital practice he had come to the conclusion that sufficient attention was not paid to conditions of oral sepsis prior to operation. The services of the dental surgeon should be requisitioned in ordinary cases prior to operation and not, as was so frequently the case, only after operation. He also mentioned a case from his practice which ended fatally after the administration of rectal oil-ether given in the usually recommended dosage and by the usual method. The patient remained comatose after operation, and eventually died in bed some six hours later. No *post-mortem* examination could be obtained, so that the exact cause of death was not elicited. He was inclined to think that this rapid death was probably due to cardiac failure from shock rather than to a broncho-pulmonary condition. The operation had been undertaken for the excision of a lupoid ulcer of the face. Haemorrhage had been severe but not markedly excessive, and the patient had been in an anaemic and debilitated condition for some considerable time.

Dr. H. P. FAIRLIE (Glasgow), commenting on the previous speaker's conclusions in the case cited by him, considered that the rapidity of the onset of serious symptoms in this case, and its ultimate fatal conclusion in such a short time, did not rule out oedema of the lungs. He quoted a case of intravenous ether administration to a lad of 15 for hernia, in which 1¼ pints of saline solution containing 5 per cent. ether

was administered. Within one hour after the administration had ceased he was called to see the patient, who was gravely ill with all the symptoms of oedema of the lungs—expectoration of frothy mucus in large quantity, laboured breathing, and intense cyanosis. The condition remained so for four to five hours and then began to clear up in response to free bleeding and continuous administration of oxygen.

Dr. W. BARRAS (Glasgow) submitted the results of 1,081 anaesthesias on male adults who had served in the army. Fallacies due to sex and age were thus omitted. The vast majority were heavy smokers and many were used to liberal supplies of alcohol. In most cases the mouth and teeth showed evidence of gross sepsis and a large number gave a history of treatment for previous lung affections. The patients were anaesthetized in a war-time structure which compared unfavourably with the usual civil hospital. Each was given 1/100 grain atropine and 1/6 grain morphine about thirty minutes prior to operation; induction was by C_2E_3 mixture followed by warm ether vapour from a Shipway's apparatus. Oxygen was frequently given in addition. In the series 386, or 35 per cent., had had previous chest trouble, whereas only 40, or 3.7 per cent., developed any broncho-pulmonary complication after operation. The morbidity rate was 3.7 per cent., as follows: bronchitis 36 cases (3.3 per cent.), pleurisy 2 cases (0.2 per cent.), pneumonia 2 cases (0.2 per cent.). The mortality rate was *nil*. There were no cases of oedema, embolus, infarction, or abscess formation. Dividing the operations into groups, there were 52 head cases, of which 32 were for bone grafting, the rest for removal of foreign bodies, painful scars, etc. One case of pleurisy occurred in this group, the pleurisy occurring in the side from which a rib had been removed to form a graft. The average duration of anaesthesia was forty-five minutes. In the group for nerve sutures and repairs, 172 cases were dealt with, the anaesthetic average being thirty-five minutes. Bronchitis occurred in 4 cases. In the groups for bone grafting, plating, etc., 77 cases showed 5 cases of bronchitis after an average anaesthetic duration of eighty minutes. The abdominal group showed 63 cases with forty-five minutes' average duration of anaesthesia, resulting in 6 cases of bronchitis, 1 of pleurisy, and 1 of pneumonia; the pleurisy case suffered from subdiaphragmatic and liver abscesses. A miscellaneous group of 717 cases with an anaesthetic duration averaging forty minutes yielded 21 cases of bronchitis and 1 case of pleurisy and pneumonia. The latter case followed removal of ribs to facilitate drainage of a chronic empyema. The most striking feature of the statistics was the heavy incidence of complications in the abdominal group out of such a low morbidity rate.

This he attributed to several apparently trivial points—for instance, pain on coughing, dorsal decubitis with tendency to hypostatic congestion as a result, limited diaphragmatic movement resulting from pain and bandaging, with lessened pulmonary ventilation, and lastly, morphine and atropine exhibited freely after operation, reducing cough and favouring accumulation of secretion. He quoted a communication to the BRITISH MEDICAL JOURNAL (June 10th, 1922) from Mr. D. P. D. Wilkie of Edinburgh on the frequency of lung complications in persons suffering from inflammatory affections of the gall bladder and ducts, which would probably have been attributed to the anaesthetic, especially if ether had been used, had not a careful examination been made prior to operation. In conclusion, he stated that he believed "aspiration pneumonia" was an extremely rare sequela resulting from sucking gross septic matter into the air passages. His view was supported by his figures when it was remembered that most of his cases presented gross oral sepsis. He doubted whether chemical or mechanical irritation from anaesthetic vapours played much part in the etiology of post-anaesthetic complications. He believed that many factors were at work simultaneously, and that the anaesthetic vapour favoured complications by reducing the opsonic index of the blood, with consequent growth and multiplication of the causal organisms present in 60 per cent. of normal throats.

Dr. W. STIRK ADAMS (Birmingham), speaking as a member of the house staff of the Birmingham General Hospital, said that his work last winter in the general surgical wards brought him into close contact with the clinical side of the question. His limited experience led him to suspect that many cases of post-operative pneumonia were really cases of lung collapse, as in the course of six months out of 12 severe unexpected post-anaesthetic lung complications, 3 were cases of massive collapse, and in 3 others this condition was strongly suspected but could not be proved. His first case of this nature, a very typical one, was the one of G. W., a healthy man, aged 20, who had a radical cure for right inguinal hernia performed. Thirty-six hours later he woke from sleep distressed and coughing, and from his general condition, and physical signs in the right base, lobar pneumonia was diagnosed, but to the speaker's surprise it was later established that a massive collapse of the lower lobe of the right lung had taken place. In collecting statistics of chest complications he found that the only reliable records were the *post-mortem* reports and the records of pulse respiration and temperature, especially when taken four-hourly during the critical period. Both in preventing and treating these cases he would suggest the extended use of atropine after anaesthesia, especially in the recovery stage where there was an excess of bronchial secretion. In this connexion the following case, in which 1/20 grain of atropine sulphate was given in the course of fourteen hours, seems worthy of mention. G. M., a male, aged 17, previously healthy, was operated upon for perforative appendicitis. Within twelve hours of operation he had signs of severe bronchitis, and four hours later was cyanosed with severe dyspnoea, and a respiratory rate of 44 a minute. Atropine, 1/100 grain, and oxygen were administered and temporary relief obtained, but three hours later his records were: temperature 104°, pulse rate 168, respirations 44; his condition seemed hopeless. The atropine was repeated, and again at further intervals, the fifth dose being given thirty hours after operation, after which he steadily improved and made an uneventful recovery. At no period were signs of atropine poisoning present nor were any signs of consolidation found in the lungs then or later. The speaker wished to thank Mr. Seymour Barling for permission to publish the notes of the cases cited.

DIFFERENT EFFECTS PRODUCED BY EXPOSING TISSUES TO VARIOUS CONCENTRATIONS OF ANAESTHETIC VAPOUR.

BY

A. L. FLEMMING, M.B., CH.B., M.R.C.S., L.R.C.P.,

Bristol.

MY excuse for addressing you is that I feel that, although remarkable improvements have been made in anaesthesia during the past twenty years, we can hardly claim that the ideal drug or method of administration has as yet been discovered. What form such an ideal anaesthetic, if it ever arrives, will take it seems impossible to predict; but whether a gas, an electric current, or a hypodermic injection, it will have to be so innocuous and so simple to administer that the personal factor can be eliminated and the skilled administrator dispensed with. The surgeon, in fact, will act as his own anaesthetist, and instead of pneumonia and bronchitis, pulmonary embolism and infarct will alone exercise his mind. The most likely place in which such an invention might originate is in one of the scientific departments of a university, but there seems to be a danger that such a discovery, if made, might be lost sight of owing to a want of interdepartmental co-operation.

The study of anaesthesia has been shown by Claude Bernard[1] to be within the province of all engaged in work on living organisms, since all such organisms are susceptible to anaesthesia, and the subject may therefore justly claim the attention of the physiologist, chemist, biochemist, zoologist, botanist, and physicist. As a result of the interchange of knowledge, we have seen magnesium sulphate, originally used by biologists for anaesthetizing marine animals, employed by Meltzer for producing spinal analgesia, and subsequently by others in synergic anaesthesia. Chloroform was suggested by a chemist, and, because its value was recognized, adopted at once. Nitrous oxide was suggested by Humphry Davy and neglected for fifty years for want of suitable investigators. This oblivion ought surely to be made impossible. Again, we have Vernet pointing out the close association which exists between certain electric phenomena and anaesthesia, and one wonders whether Le Duc's[2] electric anaesthesia might not be rendered practicable if scientific knowledge were brought to bear on the technique.

As to whether experiments with anaesthetics on lower organisms have any bearing upon our own work or teaching, it may be claimed that there are many factors common to

both cases. For instance, as correct dosage is of paramount importance in our case, so in the case of some of the lower organisms there is only a very narrow margin between the concentrations necessary to produce a reversible arrest of functions on the one hand, and to cause an irreversible arrest, or death, on the other. As an example, the chlamydomonas, a free-swimming vegetable cell, may be taken; 0.1 per cent. solution of chloroform stops movement, and after one minute in contact causes death, whereas 0.8 per cent. ether solution stops movements and recovery of most takes place after five minutes' contact; ether therefore proves more reversible than chloroform. My experiments were interfered with by the swarming of the chlamydomonas coming to an end. This organism was used in Harvey's[5] experiments.

There is with most organisms a wonderful uniformity in the way their functions are in turn stimulated, retarded, arrested, and destroyed by increasing concentrations of ether or chloroform, and my few experiments have suggested a greater reversibility with ether than with chloroform. Stimulation is difficult to explain and to reconcile with theories as to the way in which anaesthetics act. I have failed to elicit a stimulation stage in the anaesthetizing of yeasts and seeds, but one significant direction in which stimulation can be shown to occur is in phagocytosis, as noted by Hamburger.[3] In some opsonic index counts made for me some years ago, before and after ether anaesthesia had been induced, there was increase in the latter case varying from 0.2 to 0.4; this was also the case in an opsonic index count which a pathologist kindly made for me in an etherized patient recently. If small doses of ether can be shown to raise the patient's resistance to such organisms as the tubercle bacillus, we may find some justification for the employment of ether as a curative agent in phthisis as suggested by Dr. Hodgson[4] in 1909.

Clinically we may not uncommonly see "chesty" conditions improve after operation, the credit being attributed, generally with justice, to the surgical procedure, but in what measure our anaesthetic should share in the credit it is difficult to say. The fact that practically every sort of living tissue is susceptible to the action of anaesthetics must make it difficult for scientific investigators to choose the most profitable point at which to attack this mysterious subject. But the more one considers the results of researches in anaesthesia, the more one realizes that our present drugs, if used in high concentration or over prolonged periods of time, produce a toxic effect and tend to depress vitality to such an extent that it is our bounden duty to make an art of employing the minimal dosage which is compatible with the surgery in hand. The dosage we can control, and the surgeon can be relied upon to limit the time of exposure. Complete reversibility is our first care, and the drug, or method, which offers us the widest interval between reversible and irreversible arrest of activity in our patient is the anaesthetic of choice.

It is in working along some such lines as these that I think our lay colleagues may most likely help us in our search for an ideal. Many experiments on lower organisms suggest that chloroform is more toxic than ether. For example, ciliary movement of the buccal membrane of the frog recovers more quickly after ether than after chloroform. In free-swimming protozoa which move by cilia the cessation of movement caused by ether is often temporary, whereas that produced by chloroform is generally permanent and accompanied by dissolution of the organism with rupture of the cell wall. This destructive effect of chloroform and ether upon plasm membrane is seen also in haemolysis of blood and in prevention of osmosis in the dandelion stem, or by loss of colour by beetroot when placed in water after being exposed to ether or chloroform.

I do not propose to tire you with details of experiments and accounts of failures, but I should like to suggest that regular and exhaustive research ought to be undertaken with a view to finding some innocuous and yet efficient drug or method, and that data gathered in experiments on lower organisms may be of great help in such research, which must be undertaken, not by tired anaesthetists in their recreation time, but by energetic scientists in their working hours.

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Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

A COMPLICATED CASE OF INTUSSUSCEPTION.

Acute abdominal conditions in young children sometimes present very great difficulties in diagnosis, objective symptoms only being available. The following case illustrates the ease with which serious mistakes may be made.

A male child, aged 9 months, was seen at 3 a.m., help being sought by the parents because the patient seemed "very poorly" and unable to micturate. Examination revealed a large inguinal hernia together with a tight prepuce. The child looked ill and had a quickened pulse; the temperature was not raised and there had been no vomiting. Some blood had been noticed in the stools. The hernia was readily reduced by manipulation, and as a temporary measure the prepuce was stretched. Though it appeared that a sufficient reason had been found to account for the child's condition an uneasy feeling remained that this was not all, and the possibility of an intussusception could not be dismissed. When seen again a few hours later there was no improvement in the general condition; he appeared to be suffering from definite colicky pain and refused his food.

While we were discussing the case he passed a blood-stained stool, which to our minds settled the diagnosis. Immediate operation was decided upon. No tumour could be felt through the abdominal wall or on rectal examination even when the child was under the anaesthetic, nor could any emptiness be detected in the right iliac fossa.

On opening the abdomen a well-marked ileo-caecal intussusception was found and readily reduced. Complete recovery followed.

The question occurred to us whether the hernia had anything to do with the causation of the intussusception by setting up irregular peristalsis, etc.

Noël Herbert, L.R.C.P. and S.I.
F. G. Norbury, F.R.F.P.S.G.

Chester.

TERMINAL HYPERPYREXIA.

The following note of an unusually high temperature, well authenticated, may be of sufficient interest to be recorded in the Journal.

The patient was a man, aged 27, discharged from the army with hysteria and otitis media. There was a history of fairly frequent fits, hysterical in character, since November, 1919; also of otorrhoea intermittently since that date. He was admitted to hospital on August 10th, 1922, in a poor general condition with left otorrhoea. The region behind the left ear was red and tender, and fomentations were ordered; after this the condition subsided somewhat. During his stay in hospital the patient had about half a dozen hysterical fits. A radical mastoid operation was performed on September 27th. Two days later definite signs of cerebral abscess appeared, and despite all efforts death ensued the next day.

The interesting point in the case is the unusually high temperature registered on the last day of life:—6 a.m.: Pulse 68; axillary temperature 101.2° F. 7.30 a.m.: Pulse 100; axillary temperature 101.4° F. 10 a.m.: Pulse uncountable; axillary temperature 108.6° F., the latter temperature being maintained to the end, fifteen minutes later.

There was no doubt about the temperature, different thermometers being employed and the temperature readings taken personally. As these readings were taken in the axilla it is probable that the mouth and rectal temperatures were near 110° F.

A. Massey, M.B., D.P.H.

This high temperature of 108.6° F. in the axilla was confirmed by me at the time with my own thermometer.

Leeds. H. S. Carter, M.D.

In December, 1921, there were 47 lepers in Sardinia, aged from 17 to 72, 24 of whom were males and 23 females. Eight were of the tubercular variety, 26 of the nervous, and 13 of the mixed.

A special course in orthopaedics will be given by Dr. Calot from January 2nd to 22nd, 1923, at his clinic, 69, Quai d'Orsay, Paris. The course will include such instruction in orthopaedics as is indispensable to medical practitioners (on congenital dislocation of the hip, infantile paralysis, scoliosis, etc.), on the treatment of non-pulmonary tuberculosis, and on the practical treatment of fractures. Instruction will be given not only in French but in English and in Spanish. The fee is 150 francs; further information may be obtained from Dr. Colleu, Clinique-Calot, 69, Quai d'Orsay, Paris.

British Medical Association.

CLINICAL AND SCIENTIFIC PROCEEDINGS.

METROPOLITAN COUNTIES BRANCH: WILLESDEN DIVISION.

A MEETING of the Willesden Division of the British Medical Association was held on October 18th, with Dr. SKENE in the chair, when a paper was read by Mr. F. D. SANER.

The Chronic Abdomen.

Mr. Saner said that his object was to give a survey of some of the chronic disorders of digestion associated with abdominal pain. Although in the diagnosis and technique of treatment of such cases much progress had been made, there was still a marked divergence of opinion on the possible fundamental pathology, on which treatment must primarily depend, and also on the meaning of investigation results and the operative findings in the abdomen. Roughly, this large group of cases fell into three groups, as estimated by the symptoms, *x*-ray, chemical, and operative findings: Class 1, in which the symptoms were mainly abdominal pain or discomfort, erratic and irregular in type, and in which no gross local lesion was discoverable. Class 2, in which a definite local lesion—for example, a gastric or duodenal ulcer, cholecystitis with or without gall stones, etc.—was present. Class 3, in which the symptoms were largely abdominal—namely, "indigestion" and "constipation"—but in addition marked changes were shown in the nervous and endocrine systems, with general signs of auto-intoxication.

In Class 1 the main symptoms were irregular abdominal pain, more or less associated with or excited by food, gradual in onset, but rarely with any direct causative factor. The symptoms were associated with a low position of the stomach and large bowel, with spasm or delay in sections of the tract, frequently with a mobile ascending colon and bands or kinks at certain points. The relation of those symptoms to the appendix was then considered; although the appendix was frequently diseased, that was only one among further changes in the intestinal tract. In such cases removal of the appendix was a sound procedure, as the foundations were laid for an acute process, but it was a limited measure. A further mechanical cause was discussed in the drag due to the dependent position of the stomach and intestines with special stress at certain fixed points; this drag, accentuated, perhaps, by external causes, produced neuro-muscular changes in the intestinal wall with consequent hyperexcitability or inertia. A large part was played in the production of this drag by the large bowel as a whole or by a mobile ascending colon with its pull on the abnormal mesentery. The relative value of surgical treatment in these conditions was also discussed.

Class 2 presented a definite gross lesion, probably partly infective or toxic, partly mechanical in origin, and the point was raised as to whether these cases were a further step in the evolution of Class 1 or a collateral manifestation of the same basic pathology. It was characterized by the typical pain, regular with periods of intermission, as contrasted with the pain of Class 1. In attempting to explain the causation of a chronic ulcer, the fact that almost always identical areas were involved pointed to a certain specificity on the part of the infective agent. With the object of defining the source of the infective factor, reference was made (1) to dental sepsis in general, (2) to the appendix, (3) to the end-results of intestinal stasis or altered bacteriology of the tract, and (4) to the action of infarction emboli of bacteria. The main difficulty in accepting these suggestions seemed to be the disproportion of cause and effect. In searching for a common predisposing cause, it was seen that the ulcer-bearing area corresponded to the area of constant mechanical strain. The operative treatment of the gross local lesion was discussed, and stress was laid on the importance of after-treatment.

The cases in Class 3 were grouped into various special departments according to their predominant symptom complex. The main abdominal symptoms were chiefly "chronic indigestion" and "constipation," while there was a general failure in the endocrine and nervous systems. The whole was regarded as a "deficiency" or "degenerative" disease, and, as a cause, the possibilities were discussed of chronic auto-intoxication from various sources, the heritage of tissues unable to deal with the stress of life in general, and the effects of toxins inherited from the parents.

In the discussion which followed the paper, Dr. SKENE, Dr. ANDERSON SMITH, Dr. TRAYLEN, and others took part, and Mr. SANER was afterwards accorded a hearty vote of thanks.

Reports of Societies.

THE PROGRESS OF SURGERY.

AT the meeting of the Section of Surgery of the Royal Society of Medicine on November 1st Mr. JAMES BERRY, the incoming President, delivered an address on the progress of surgery, which was followed by a discussion.

Mr. BERRY said that it had fallen to his lot to witness during his surgical life the most wonderful progress that surgery had ever made in so short a time. As a student he just saw the termination of the pre-antiseptic days. Much of the progress which had been made in surgery was due to the application first of antiseptic and later of aseptic principles to the treatment of operation wounds. In his very early experience he remembered surgeons who wore frock coats at operations, and the more dirty and blood-splashed the coat the prouder its wearer seemed to be. He had seen a hospital surgeon stop in the middle of an operation to scratch his head; he had seen a surgeon put his hand in his pocket, take out his glasses, put them on, and continue the operation; he had seen a surgeon divide a ligature with his teeth when the scissors were not handy. It was not necessary to embark upon any eulogy of modern surgical triumphs, but he thought there was some danger to-day lest the ordinary surgeon be over-impressed by the brilliant results of a few outstanding masters, and imagine that he could do anything that they did. An extensive operation upon the brain, which might be a brilliant success in the hands of a Harvey Cushing, might result in terrible disaster in the hands of a surgeon not specially trained along this line, even though the same method of operation be followed in each case. At one period in his own surgical career he had the good fortune to be surgical registrar for five years at a large hospital, and to make large numbers of *post-mortem* examinations. The young surgeon could have no better training than that which was obtainable in the post of registrar if it involved, as it ought to do, the clinical observation of patients in the wards, the witnessing of all important operations, and the doing of *post-mortem* examinations. The modern practice of entrusting surgical necropsies to a non-practising pathologist was in some respects a retrograde step. Only assiduous attendance at hospitals enabled the young surgeon to acquire experience, especially in those operations which were undertaken when sepsis was already present, as in acute suppurative conditions of the abdomen. It was not so much a mere grounding in technique that was needed as the experience and knowledge of what to do and what not to do. His own opinion was that operations for appendicitis were performed rather too frequently at the present day, but he knew of no rule as to when such an operation should be undertaken, and each case of appendicitis must be dealt with on its merits, according to the judgement of the operator. With peritonitis he thought it was generally useless to attempt thorough cleansing of the peritoneal cavity, and he described cases in support of this view. The peritoneum itself had enormous powers of repair; it should be interfered with as little as possible. He was reminded of what one of his former teachers, the present President of the Royal College of Surgeons, used to say: "Think, before you do an operation, what is likely to be the course of the disease if the case is *not* operated on, and what is likely to be the effect of your operation." Cases were often undertaken without serious consideration of this important point. It was frequently stated that the modern custom of operating freely for acute appendicitis had resulted in great saving of life. If this was so, surely deaths from appendicitis would be far less frequent now than they used to be unless one could assume, as some boldly did, that the disease itself had become more frequent. Of this there was no clear evidence. He had compiled from the Registrar-General's returns the figures for the deaths from appendicitis and perityphlitis in England and Wales for certain periods as follows:

Deaths from Appendicitis and Perityphlitis.

1901–05	8,291
1906–10	10,886
1911–15	12,740
1916–20	12,418

These statistics, however, needed correction by reference to other conditions, among which, especially in the early periods,

appendicitis might have been ranked, and to the totals for all diseases of the digestive system:

Total Deaths (England and Wales).

	Peritonitis (non-puerperal).	Intestinal Obstruction.	Gastric Ulcer.	All Diseases of the Digestive System.
1901-05 ...	5,460	12,759	8,386	145,330
1906-10 ...	3,424	12,980	8,786	138,334
1911-15 ...	2,740	12,632	9,374	149,759
1916-20 ...	2,155	12,977	9,650	123,101

Mere statistics, however, were apt to be misleading. He brought forward all these figures rather as food for reflection than with the intention of drawing any definite conclusions from them.

No doubt the war (Mr. Berry continued) in many directions produced great advances in surgery, but in one respect it brought a disadvantage. Large and dangerous operations were now being undertaken by many practitioners whose chief experience had been of military injuries, inflicted for the most part upon young and healthy men. Such experience did not give the necessary qualification for dealing with, say, tumours of all kinds, diseases of the stomach, colon, prostate, and so on. There was too much inclination to imagine that operative surgery was a very easy matter, and that the young surgeon had only to exercise surgical cleanliness and then could proceed to do with impunity anything that he had seen his seniors do. Later on he was likely to find that in actual practice this was not so easy. Mr. Berry gave instances, some tragic and others amusing, of the mistakes he had seen made by men who strayed into fields of practice which did not belong to them. One useful reflection was that they became wise through seeing the errors of their predecessors. His own favourite definition of a good surgeon was "one who always knows when to put in and when to take out a drainage tube." In conclusion he quoted a description of a surgeon recently written by Sir Frederick Treves, who likened the knowledge which the surgeon must have of the human body to the knowledge which the forester must have of his wood.

Sir JOHN BLAND-SUTTON said he had been specially interested in what Mr. Berry said about the inexperienced man in general practice undertaking operations which sometimes caused surgeons of experience to quail. Forty years ago there was not a book entirely devoted to the subject of operations in general or to special surgery. To-day such books were plentiful, and commanded a ready sale, but, of course, it was a poor way of learning how to perform radical operations by studying them from a book, no matter how well written or lavishly illustrated. The modern treatment of wounds had changed the qualities expected of a good surgeon. In pre-antiseptic days the qualities of a good surgeon were a thorough knowledge of human anatomy, courage, and manual dexterity. Since the introduction of antiseptic and aseptic methods it was a truism that, although the brilliant surgeon might attain fairly good results, he was often beaten by a slow and sometimes clumsy colleague because the latter was more careful with his asepsis. It had been said that the man who now practised as a surgeon might achieve great success even if he had a shaky hand, but that the man with the shaky mind was hopeless. During the last twenty-five years the number of operations done in hospitals had increased fourfold, and the surgical staffs of hospitals had also largely been increased. The amount of operating done in a hospital was so great that the surgeon found it difficult to do all the operations which came to him in his wards, and if he had a capable house-surgeon he allotted a fair number of the lesser operations to him. There were more house-surgeons training in London than could possibly receive appointments on the staffs of hospitals either in London or the provinces, and many of them would go into general practice, where they naturally wished to do such operations as were within their power. It was well understood that a successful operation upon a popular person might make a great reputation, but, on the other hand, in a small community an unsuccessful operation upon a poor person might ruin a practice. In small towns or groups of towns a team arrangement was coming into being; one member of the team would be a good anaesthetist, another would have surgical proclivities, a third would be well trained in gynaecology, and a fourth in laryngology; and with the help of a well-trained nurse a nursing home would be started in which these men would work together and sometimes make a good living by doing all the surgery without calling in any outsiders. But such practitioners must remember that when they ventured upon an unusual operation, or even an operation which they thought straightforward, they might find themselves faced with difficulties which would try the boldest and most experienced surgeon. Unless a man was going to do a certain amount of minor surgery he might find it rather difficult to make ends meet, but he should keep well in mind the warning that many minor operations ended in major disasters, and that this might happen not only to beginners but to surgeons of experience and men of renown.

Sir W. ARBUTHNOT LANE said that while occasional surgical failures might not be noticed in London, it was different in smaller places, where they might seriously affect a man's practice. A famous American surgeon once said to him that he was very careful about his mortality, because "if I send one of my patients home in a box to his particular place, that place becomes a dry spot for me." It was possibly a good thing to see an operation badly or imperfectly performed. A good deal more was learnt from such an operation than from one that was perfectly done. Once when some Americans surgeons were over here they visited a hospital, and one of them was seen to be taking notes furiously. His colleagues, who did not think much of the operation, asked him why he was taking such careful notes, and he replied, "I was putting down all the things one should not do." The general practitioner in this country laboured under some disadvantage as compared with his American colleague. An American doctor, after qualification, put his money into travel. He went round and saw the best surgeons in the world—Paris, Vienna, Berlin, and his own Rochester. The other day the speaker was in Germany, talking to some American surgeons, and trying to get them to come to England. "But," they said, "we live for next to nothing here, and we get intensive courses, beginning at seven in the morning and going straight on until five. Will your people get up before seven o'clock in the morning to teach us?" And, of course, when the American doctor went back home there was a description in his local paper of the places he had been to, his appreciation of the men he had seen, and perhaps, also, their appreciation of him! Nevertheless, the speaker fancied that the English surgeon and general practitioner, however difficult his process of evolution, would come out in the end equal to anybody else in the world.

Professor A. W. SHEEN said that he had been hoping to hear from Mr. Berry of operations which had been in great vogue and were now out of date. Such operations when they were introduced were always backed up in the periodicals by a series of statistics, how obtained he did not know, and yet afterwards the operation went entirely out of vogue. He passed on to speak of the value of the follow-up system in estimating surgical results—not merely the results from the point of view of the immediate danger of the operation, but from that of any permanent damage or impairment which might result. In saying this he was referring to such quite common operations as those for hernia, hydrocele, haemorrhoids, varicose veins, and so forth. There were often little troubles or disabilities which resulted owing to an imperfect operation or to some damage which was done and need not have been done at the time it was performed. As to the need for training surgeons, he was inclined to think that this was not sufficiently appreciated in London, or in big provincial towns, where the highest surgical skill was always available. But men went out from the schools of this country into all the world, and had to perform operations which there was no one else to do. In India he had seen something of the work of the Indian Medical Service, and he was filled with admiration for the way in which its members tackled, and tackled well, all sorts of jobs. But he still felt that for the men who went out into distant portions of the empire more ought to be done in the way of special training for the great amount of surgical work which called for their attention. He appealed also to writers of textbooks to describe operations as far as possible in such a way that a person reading the description could perform the operation.

Sir D'ARCY POWER said that so far as he had had experience of the surgical work of general practitioners he had no fault to find with the way they did it, but he thought they were not always as careful as they should be in making their diagnosis beforehand. Dr. F. W. COLLINGWOOD thought that there was not sufficient trouble taken in this country to

furnish opportunities for practical experience in surgery to men who would go out as general practitioners and would of necessity be called upon in emergency to do operations when to call in a surgical specialist was out of the question.

THE ANAESTHETIZATION OF PATIENTS FOR CLASSICAL CAESAREAN SECTION.

AT the meeting of the Section of Anaesthetics, Royal Society of Medicine, held on November 3rd, Dr. HERBERT SPENCER opened a discussion on "The anaesthetization of patients for the classical Caesarean section." His paper is printed in full at page 905.

The President, Dr. A. L. FLEMMING, read letters contributing to the discussion from Dr. Miles Phillips, who stated that for some years he had used ether and had had no trouble from asphyxia of the child, whereas when he used chloroform the trouble was that the child would not cry; and from Dr. Goodman Levy, who referred to the immunity from chloroform syncope of women in labour—an immunity with which, he believed, the peculiar temperament of the pregnant woman had something to do.

Dr. LIONEL SMITH raised the question whether deep anaesthesia throughout labour was really harmful to the child. He had seen hundreds of ordinary labours under deep anaesthesia, and the children, often after prolonged manipulation, had been born alive and able to breathe. It was otherwise very often with the child delivered by Caesarean section, because that child had not gone through the necessary process which fitted it for life in the open. Dr. A. B. KINGSFORD agreed with Dr. Spencer's method; he had done about thirty cases by this method, and they had given him no anxiety—the child seemed to breathe almost immediately. Dr. H. W. FEATHERSTONE supported the open-ether method, regarding this as preferable for the mother, and he had never failed to induce the child to breathe, though he admitted that many of the children suffered to some extent from asphyxia. With regard to the previous administration of drugs, he did not quite see why atropine should have any ill effect, though he agreed that morphine was to be avoided. His practice usually was to induce anaesthesia by means of pure ethyl chloride with the open mask, and then to carry on with ether in the ordinary way. He had carefully noted blood pressures, and had found no very great drop at any stage in the operation. Dr. E. W. GANDY said that experiments on animals, supported by evidence from observations on the human, suggested that the child *in utero* did not stand chloroform so well as ether. Dr. H. J. SHIRLEY agreed with Dr. Spencer's method, and referred to the desirability of adopting inhalation rather than spinal anaesthesia because of the importance of eliminating psychic shock. Dr. A. S. DALY, on the other hand, totally disagreed with Dr. Spencer. In his own resident days the patient upon whom a Caesarean section was done was always given chloroform, and when this was done there was the greatest difficulty in getting the babies to recover and to breathe well. But with open ether there was a great improvement in this respect: there was not the same trouble with the children. He agreed as to the objections to spinal anaesthesia, one of the difficulties of which, in the case of the pregnant woman, was to get the position in which to give the injection. Dr. F. W. LONGHURST said that his experience was that asphyxiation had to be dealt with far more frequently in ordinary deliveries, instrumental or otherwise, than in Caesarean section. Whether there was some medullary injury in these so-called normal deliveries he did not know. In ordinary Caesarean sections he had always induced or half induced anaesthesia with chloroform, and carried on with a mixture of chloroform and ether, probably adding the ether rather later when the mother was well under. He did not recall any trouble with the respiration of the child afterwards.

Dr. J. BLOMFIELD said that Dr. Spencer's experience did not tally with his own as regards the effect on the child. He asked whether Dr. Spencer had noticed anything to suggest that the effect on the child was due to ether in the respiratory passages. Was there any mucus in those passages? In his own experience of Caesarean section a mixture of chloroform and ether was given, and he had seen nothing of asphyxiated infants. Dr. E. G. BOYLE was rather surprised to hear that the children who were delivered by Caesarean section when the mother was given ether were asphyxiated, and he was curious to learn the reason why. He would have thought it safer to have given ether than to have given chloroform. He had an idea that a good many of the deaths in childbirth were due to chloroform. He gave an account of the gas and oxygen method, and of its use in Canada, where he had seen and appreciated it. Dr. W. J. MCCARDIE suggested that the method of ether administration might possibly account for the results which Dr. Spencer had mentioned, and asked whether he had found asphyxia caused more frequently by the open than by the closed method of giving ether. Dr. F. E. SHIPWAY thought it a pity that anything should be laid down as a routine method when conditions so various called for methods adaptable to each particular case. Dr. C. F. HADFIELD'S experience was that the child breathed very much better if ether rather than chloroform were given throughout. In the ordinary confinement ether was given very satisfactorily indeed. Dr. F. W. COLLINGWOOD said that he had found the effects of chloroform on the child to be such that he took to open ether, first giving twenty drops of chloroform to dull the sensibility of the mother, and then continuing with the ether.

Dr. HERBERT SPENCER, in replying to the discussion, said that if more of his obstetric colleagues had been present he would have received a larger volume of support in favour of the method he had advocated, because their experience was that children were frequently asphyxiated under the ordinary administration of ether. With chloroform administered as he administered it the child was never asphyxiated, though he agreed that the governing factor was not chloroform, but chloroform plus x—meaning by x the expert administrator. As to the previous administration of drugs, he was not very fond of atropine, though he did not know that there was any particular objection to its use. Morphine certainly should not be used, as it introduced an element of danger for the child. In reply to Dr. Blomfield, he did not think that there was any mucus in the air passages of the asphyxiated child. The child was simply poisoned by the ether given in too large quantities. He thought it quite possible that the gas and oxygen method was useful, but no one in this country had had much experience of it, and his own preference was for a quieter method, for it was very important that the patient should not strain. Altogether he was not satisfied with the discussion, because he had not been told definitely whether a patient ran any appreciable risk from having chloroform given for six minutes. It ought to be remembered that he was not advocating any prolonged administration of chloroform; some speakers, in comparing the advantages of different methods, had appeared to suppose that his method implied an indefinite chloroforming. This was not the case at all. He did not think that there was any risk, if the chloroform was administered by an expert, but if anaesthetists declared otherwise he would reconsider his position. As it was, he felt that his experience justified him in going on with his method.

Dr. C. W. DUNN of Philadelphia, in reply to a remark in Dr. Spencer's paper with regard to the employment of nurses to give anaesthetics in the United States, said that the reason for this was that at present in America there was a great shortage of doctors. The medical students now entering were only 50 per cent. of the number who entered in 1912, and yet during the last ten years the population had greatly increased. The decrease in the number of men training for medicine was due to the prolonged course—now six years, and possibly soon to be eight—necessary for obtaining a medical degree. In those circumstances it had been necessary to train nurses to give anaesthetics, but they did so under the supervision of medical men.

TREATMENT OF BONE AND JOINT TUBERCULOSIS.

THE second meeting of the Sheffield Medico-Chirurgical Society this session, with the President, Dr. RUPERT HALLAM, in the chair, was held on October 26th at the King Edward VII Hospital, Sheffield, a hospital devoted to the treatment of bone and joint tuberculosis in children. The medical superintendent, Dr. C. LEE PATTISON, demonstrated some of the cases in the hospital, and showed the methods he adopted and the apparatus he used in the treatment of various types of joint and bone tuberculosis; the special plaster room was visited. Dr. Lee Pattison then read a paper on "The local treatment of acute tuberculous disease of the hip-joint and vertebrae." He laid emphasis on the fact that tuberculous joint disease was merely one local manifestation of a general disease, and deprecated the radical measures that had been adopted formerly in the treatment of these

conditions. He was an ardent upholder of the conservative methods as laid down by Ménard, Calvé, and Calot in France and by Sir Henry Gauvain in this country. Complete immobilization and the prevention of muscular spasm were the essentials in treatment, and on these attention should be concentrated. In the hip-joint, in addition to extension in the axis of the limb, Dr. Pattison had found lateral extension in the axis of the femoral neck very useful. When the spasm of the muscles had diminished and the limb was in good position and there was no sign of abscess formation immobilization was maintained best by fixation of the limb in a plaster-of-Paris splint. In the vertebrae, tissue destruction and the effects of muscular spasm in producing a kyphotic deformity might be minimized by fixing the patient in a recumbent position with a pad exactly under the spinous processes of the affected vertebrae. Aids in the carrying out of this treatment were obtained by utilizing some type of "swinging back door" or the "wheelbarrow" splints. Extensions might be fixed to the head or lower limbs if necessary. He thought that Albee's operation was justifiable in adults only where time was absolutely essential, and was definitely contraindicated in children. Abscesses should be treated by aspiration, repeated many times when necessary; the details of the technique of the operation were described and the advantages of the various modifying liquids enumerated.

The PRESIDENT, Mr. J. B. FERGUSON WILSON, Mr. E. FINCH, Mr. MILES PHILLIPS, and others took part in the discussion which followed. Dr. LEE PATTISON was warmly congratulated on the results of the procedures he adopted, as was evidenced by the excellent appearance and wonderful vitality of the patients undergoing treatment.

TREATMENT OF DISSEMINATED SCLEROSIS.

THE first ordinary meeting of the new session of the Liverpool Medical Institution was held on October 26th, with the President, Dr. J. HILL ABRAM, in the chair.

Dr. W. JOHNSON, in a note on drug therapy in disseminated sclerosis, dwelt on the necessity of treatment in the early stage of the disease, before the nervous system had become riddled with plaques of sclerosis. He reviewed briefly the symptoms which usually occur first, and said that frequently these symptoms were regarded as hysterical. A not uncommon history was that of a slight pyrexial attack followed by vague paresis, paraesthesia, temporary diplopia, or misty vision. Subsequently marked improvement occurred, until a new attack followed with a fresh exacerbation of symptoms. Such a series of remissions in the course of a progressive nervous disorder was almost diagnostic of disseminated sclerosis. Continuing, Dr. Johnson stated that during the past two years ten early cases of the disease had been treated with intravenous injections of novarsenobillon. An initial course of six weekly injections (0.15, 0.3, 0.45, 0.45, 0.6, and 0.6 gram) was given. This was repeated six months later. In between the two courses, and subsequently for a year, liquor arsenicalis was given by the mouth. Such a line of treatment has seemed to stay the progress of the disease, but observation over a longer period is necessary before any conclusions can be drawn. Dr. Johnson added that the first suggestion for this form of treatment came from Dr. Farquhar Buzzard.

Dr. T. R. GLYNN remarked that it was satisfactory to learn that there was a prospect of doing something by treatment for that hopeless disease disseminated sclerosis. Unfortunately, it appeared that treatment to be successful must be adopted in the early febrile stage. The recognition of the affection in that stage must be difficult and depended on the ability of the general practitioner rather than on that of the specialist or physician, who generally meet with disseminated sclerosis when more advanced.

Dr. JOHN OWEN referred to the importance of and difficulties attending early diagnosis. He read a communication from DR. RANSOME, who was unable to attend the meeting. Dr. Ransome had treated 26 cases of disseminated sclerosis of a standing ranging from two to five years and over. He employed silver salvarsan intravenously—a total of 664 injections. His results were as follows: 4 were much improved, 8 no change, 2 died of intercurrent disease, 1 died of cancer. His course of treatment extended over two years.

Dr. A. DOUGLAS BIGLAND stated that he had not seen the early cases described by Dr. Johnson. The only early symptoms usually referred to by patients were temporary diplopia, temporary loss of vision, and precipitate micturition. He agreed that early diagnosis was of the utmost importance and emphasized the value of spinal fluid examinations. A metic or paretic curve with Lange's gold-sol test, together with a negative Wassermann reaction, was very suggestive of disseminated sclerosis.

Sacro-iliac Tuberculosis.

Mr. H. C. W. NUTTALL read a paper on tuberculosis of the sacro-iliac joint, in which he reviewed the literature of the subject and gave records of nine cases, for eight of which he was indebted to Professor Thelwall Thomas. Mr. Nuttall considered that the treatment advised in most textbooks was often not radical enough, and that Picqué's operation was suitable in many cases. He discussed the anatomy and pathology of the joint, and expressed the view that this supported the necessity for more radical methods. He reviewed the clinical facts and the differential diagnosis of the condition, and described in detail M. Picqué's technique, illustrating this by lantern slides.

Mr. T. P. MCMURRAY stated that in his opinion the operation of Picqué was a great advance on those previously employed and led to a much greater chance of cure. He had operated on six of these cases by a modification of this method, which he thought was a decided improvement in method. This modification consisted in the turning over of a hinged bone flap from the back of the ilium across the gap left after excision of the joint. This led to bony union and increased the stability of the pelvis.

Recent Work in Palaeontology.

Dr. J. C. M. GIVEN, in a paper on recent discoveries in palaeontology, gave an account of some of the recent work that has been done in human palaeontology. He discussed the difficulties felt by some authorities in the reconstructing of Piltdown man, especially the combination of the marked chimpanzee-like inferior maxilla with a human cranium. He then described the Rhodesian skull, and illustrated by lantern slides. He remarked that the geological evidence did not point to extreme antiquity, but its form was very primitive and ape-like, and it presented in a marked degree some of the characters of the Neanderthal race. He then pointed out the supposed evidence of mastoid disease and the fact that this was denied by Elliot Smith to be *ante mortem*. Dr. Given concluded by discussing the Nebraska tooth, with the hypothetical new genus of homo, built on its supposed human origin, and also alluded to its importance, if authentic, as throwing light on the early origin of man in America.

INCIDENTS OF OBSTETRICAL PRACTICE.

A MEETING of the North of England Obstetrical and Gynaecological Society was held at Liverpool on October 20th, with the President, Mr. HAROLD CLIFFORD, in the chair.

Dr. FLETCHER SHAW (Manchester) described a case of occlusion of the rectum following the administration of a simple enema.

The patient was a primigravida to whom the midwife administered a simple enema at the beginning of labour. There was some difficulty in inserting the nozzle and considerable pain was experienced as it was pushed in with force, with still greater pain when the enema was injected. Very soon afterwards the perineum became very swollen and red. At the end of twenty-four hours, when a doctor was called in, there was so much swelling that a vaginal examination could not be made, and the parts were so red that erysipelas was diagnosed. The patient was delivered in a side ward of St. Mary's Hospital, and then sent to the fever hospital with this diagnosis. She was later sent home, with the recto-vaginal septum completely sloughed away and a large sinus in the right ischio-rectal fossa. Eventually the rectum closed down to a mere band of fibrous tissue, and the patient is now condemned to a permanent colotomy opening. It seemed probable that the nozzle of the enema syringe was detained by a fold of rectal mucous membrane, and the force used in inserting it further pushed the nozzle through the mucous membrane so that part of the injection was given into the peri-anal tissues. This would account for the early swelling, the further swelling and redness being caused by infection of this area from the rectum.

Dr. LEITH MURRAY (Liverpool) reported a case of unsuspected pregnancy. He said that several cases of unsuspected pregnancy had been recently detailed in the BRITISH MEDICAL JOURNAL, and, in view of its medico-legal importance, it seemed advisable to record a case of that nature which had come within his own knowledge.

He was asked to see a young married woman, aged 24, in 1920, by Dr. A. C. Ransome of Birkenhead. Twenty-nine hours previously she had been delivered of a 6½ lb. child, apparently at term. She had been happily married for three years, and during most of that

time had lived abroad, where she developed enteric fever. As a result of this acute illness she lost 3 st. in weight, but during recent months was pleased to find that she was, as she thought, picking up. Her menses had always tended to be scanty and infrequent, and there was complete cessation for some time following the enteric fever. She gave, however, a very precise history of having had a more or less monthly loss throughout the whole of her nine months of pregnancy, of such duration and quantity as to lead her to believe that she was menstruating. She had had no vomiting, had felt no movements, and had no idea whatsoever that she was pregnant. Between the seventh and eighth months she announced to her mother that her abdomen was getting very big. Her mother promptly asked her whether she were pregnant, but on hearing of these "menstrual periods," and of the total absence of any other symptoms, told the daughter there could be nothing of the kind. For a few weeks before her return to Birkenhead she had been with her husband away on holiday, bathing, dancing, and golfing. Neither of them had any objection to parenthood, and, as they were well-to-do, there was no reason why arrangements should not have been made for the baby. She and her husband arrived in Birkenhead on the 27th of a certain month to be present at a celebration given by the husband's parents, and as many other members of the family had also arrived they had to be accommodated in a boarding house. While walking thither late in the evening of the 28th of the month she complained to her husband that she had eaten something at dinner which had disagreed with her, and the following morning, as she still had pains in her abdomen, her husband advised her to stay in bed whilst he proceeded to Liverpool on business. The abdominal pains increased in severity, and at 10.30 a.m. she discovered that delivery was imminent. She was unable to attract attention and delivered herself unaided at 11 a.m. The placenta was delivered normally, but there was considerable bleeding thereafter. My presence was necessitated by rather severe lacerations of the vagina, which were leading to continuous oozing. These were sutured under an anaesthetic and healed well. The child's palate was scored in several places by the mother's nails in her attempts to expedite delivery. It was noticeable that there were very few striae on the abdomen. The patient appeared to be rather big-boned but certainly not fat. Her height was about 5 ft. 6 in. She was a well-educated and intelligent girl, and her distress at the lack of provision for her offspring was very obvious.

Dr. LEITH MURRAY also narrated a case of simulated disease. The main interest in the case lay in the fact that a girl of 20 should have succeeded, by producing diapers artificially stained, in deceiving her mother, her doctor, and a consultant into believing that she was menstruating excessively.

She was brought to him in August, 1919, with the request that he should remove the uterus. Her periods, which began at the age of 15, were reported to be regular until she went to school at 16. Three months of amenorrhoea ensued, followed, the report went, by severe and prolonged periods ever since. For months at a time she was supposed to be only a few days free from loss in each month. She had been curetted in April, 1919, without any improvement, and had been given thyroid extract, hamamelis, calcium lactate, and ergot. On examination she proved to be a slim little girl, rather pale than otherwise, but not excessively so. She was highly neurotic, and rectal examination, which showed a normal pelvis, was only made with extreme difficulty. As she was not bleeding on the day when seen, Dr. Murray asked for a diaper to be sent to him. This was received a fortnight later, and presented an appearance remarkably like menstrual staining. There was, however, no trace of blood detectable by the benzidine test. Two other specimens of blood passed into the chamber were received within a few days, and were sent for analysis. A report was received that both specimens were similar in composition, and undoubtedly consisted of urine to which some colouring matter analogous to cochineal had been artificially added. When challenged by her mother the patient admitted having on one occasion only used cochineal from the kitchen cupboard to colour the diaper. The last Dr. Murray heard of her was that her mother considered she had been very unkindly treated by him and was endeavouring to find someone who would remove the uterus.

A number of specimens were shown by Dr. BRIGGS, Dr. BURNS, Dr. DOUGAL, Dr. KING, and Dr. LEITH MURRAY.

MANCHESTER PATHOLOGICAL SOCIETY.

AN ordinary meeting of the Manchester Pathological Society was held in the reading room of the Manchester Medical Society's library on Wednesday, October 18th. The retiring President, Mr. J. HOWSON RAY, vacated the chair, which was taken by Professor SHAW DUNN.

Dr. DOUGAL showed a specimen of hydrometra from a case of congenital absence of the vagina. Tuberculous salpingitis was associated with the condition. Dr. Dougal showed, further, a chorion-epithelioma of the uterus, the third that had been recognized in Manchester since 1905.

Dr. DIBLE showed a case of a single cancroid tumour of the small intestine. The growth, which was of the size of a large pea, occurred in the ileum and was found at necropsy in a patient dying of pernicious anaemia. The tumour was infiltrating and histologically malignant. The source of such growths, which appear to be identical with the cancroid tumour of the appendix, was discussed and the opinion expressed that the growth in this case was derived from intestinal mucosa and was analogous to the basal-celled carcinoma of the skin.

Dr. DIBLE also showed a case of *x*-ray epitheliomatous warts in a person who had been exposed to the Roentgen rays for twenty years. Well-marked hyperkeratotic nodules were present and also typical epithelioma. Attention was also drawn to the relative benignity of the tumour. Amputation of the affected fingers had been performed two years previously, and no recurrence had been noticed up to the present time.

Mr. GEOFFREY JEFFERSON read a short paper on distortions of the sella turcica in non-pituitary lesions. He showed some photographs of the floor of the third ventricle in posterior fossa tumours which had led to obstruction of the cerebro-spinal fluid pathway. He was also able to show the sella from one such case where the bulging floor of the third ventricle had opened up the diaphragma sellae and compressed the pituitary body. The interpretation of erosions of the dorsum sellae in the reading of *x*-ray plates was discussed, and the findings of Baetjer and Dandy in this connexion in part confirmed. Destruction of the posterior clinoid processes and of the dorsum sellae did not, however, appear to be uniformly found in adult hydrocephalus.

Dr. RILEY exhibited a specimen of sarcoma of the kidney removed from a child by Mr. H. H. Rayner. Dr. Riley referred to Mr. John Fraser's work on the renal sarcomata of infancy, and exhibited numerous sections from different parts of the tumour, demonstrating variations in histological pattern.

Mr. JOHN MORLEY described a cyst which he had fortuitously discovered free in the peritoneal cavity of a middle-aged man operated upon for acute appendicitis. This cyst contained clear fluid enveloped by a tough membrane, and its origin was not very certain. It had no attachments, and the view was put forward that it was a cyst of peritoneal development.

ON November 3rd a clinical meeting of the West London Medico-Chirurgical Society was held under the presidency of Dr. A. G. WELLS. Medical cases were shown by Drs. BURNFORD, BURRELL, CAPLAN, PENDRED, ROSS, and SAUNDERS. Mr. NEIL SINCLAIR and Mr. SIMMONDS showed surgical cases and Mr. MAINGOT showed a case for Mr. MCADAM ECCLES. The cases were exhibited in the new out-patient department of the West London Hospital and discussed in the post-graduate department.

THE first meeting of the Hunterian Society of London was held on October 16th at Simpson's Restaurant, Cheapside, E.C. After dinner the President, Dr. FORTESCUE FOX, gave an address on "The breakdowns of middle life"—a summary of many years' work. Dr. ERNEST YOUNG read a paper on "The treatment of dyspepsia in necessitous patients." During the evening the following took part in the discussion: the PRESIDENT, Sir BRUCE PORTER, Dr. SANGUINETTI, Dr. YOUNG, Dr. ROSS, Dr. BURNFORD, Dr. ASH, Dr. LANGDON BROWN, and Mr. MORTIMER WOOLF. The next meeting of the Society will be held at the Cutlers' Hall, Warwick Lane, E.C., on November 20th, when Dr. PORTER PHILLIPS will open a discussion on "The position of insanity in criminal law."

ACCORDING to the sixty-sixth report of the West Kent Medico-Chirurgical Society, the 1921–22 session was very successful. The average attendance at meetings was twenty-four, and at the Purvis Oration, which was delivered in December, 1921, by Sir James Purves-Stewart, on "Respiratory disorders of nervous origin," forty members were present. It was decided that medical women, irrespective of their place of residence, should be eligible for membership. The financial position of the Society remains strong, the balance for the year being over £265. Meetings are held in the board room of the Miller Hospital, Greenwich. The president for the ensuing year is Dr. W. H. Payne, and the secretary is Dr. C. J. B. Buchan, 326, Brownhill Road, Catford, S.E.6.

THE third general meeting of the Cambridge University Medical Society was held on November 1st, when Dr. BERNARD SPILSBURY, lecturer on morbid anatomy at St. Bartholomew's Hospital, gave an interesting and instructive lecture entitled "The criminal court and the medical witness." In concluding his lecture Dr. Spilsbury expressed the hope that he had said enough to arouse in the minds of medical students at Cambridge a good deal of enthusiasm for the subject of medical jurisprudence.

Reviews.

CLINICAL AND OPERATIVE GYNAECOLOGY.

THOSE who are familiar with Professor MUNRO KERR'S valuable book on *Operative Midwifery*—and their name must be legion—will have noted with interest and high expectation the announcement that a volume by him on *Clinical and Operative Gynaecology*[1] had been added to the list of the Oxford Medical Publications. At the outset it should be stated that the two books are not quite on the same plane. The earlier was a treatise on operative obstetrics written by an obstetrician of large experience, and it is so much thought of and so frequently quoted by his fellow specialists as to have acquired the rank of the standard British authority on the subject. The new volume is avowedly no treatise, but, according to the publishers' circular, is designed as a book to which the general practitioner can turn when faced with a gynaecological case which presents difficulties to him, or when he desires to refresh his knowledge. The clinical aspects of the subject are therefore kept uniformly to the front, and only so much anatomy, physiology, and pathology is offered as is considered essential to the proper comprehension of the clinical conditions. At the same time the book is no mere index of gynaecological treatment; rather might it be described as a presentation of the clinical knowledge of a practical teacher of ripe experience. The various points are illustrated throughout by short extracts from the author's notes of actual cases, a method which appeals to readers, and which in the present volume has been used with commendable brevity and not pushed to the point of wearisomeness.

Like "all Gaul," the volume has been divided into three parts. The first and largest is devoted to clinical gynaecology proper. Opening with a chapter of useful generalizations on the etiology, symptomatology, and principles of treatment, the author passes on to the usual summary of female pelvic anatomy. Next the examination of the patient is the subject of a full description; here five pages are occupied by a series of very small diagrams illustrating the various likely and unlikely swellings and resistances that may be found on pelvic examination. We must admire the artistic ingenuity displayed, but it is open to question whether the help the reader will derive from the diagrams justifies the space they occupy. The two succeeding chapters deal with the physiological functions of ovulation and menstruation and their disorders, and the author does not hesitate to dogmatize on points such as the cause and real significance of menstruation, which are still subjects of inquiry and speculation. The author's attitude to some of the more recent work on menstruation, as summarized, for example, in Novak's monograph, is not made evident. This chapter is followed by one on nervous disorders in relation to abdominal and pelvic disease written with characteristic ability and erudition by Dr. Ivy McKenzie, who shows himself a master of the subject and eminently qualified to expound the present state of knowledge of this highly complex relationship. Professor Bryce contributes an account of the development of the reproductive organs as a preface to the discussion of malformation.

Professor Munro Kerr then takes up the thread again in two excellent and practical chapters on displacements and injuries. With a view to simplifying the subject to the practitioner, he has deliberately departed from a strictly pathological classification of the various clinical conditions. While this may be regretted from the educational point of view and also from that of scientific accuracy, we cannot but agree that a strict adherence to any such schemes as have already been devised presents difficulties, especially in a book of this kind. Amends for his heresy are, however, amply provided in a chapter on general considerations regarding infective disease of the reproductive system. It is interesting to have a British authority declare in no uncertain terms his opinion that puerperal infection is a more common cause of pyosalpinx than gonorrhoea. We believe that other gynaecologists in Great Britain are of the same opinion (see, for instance, the recent *Encyclopaedia of Midwifery and Diseases of Women*, edited by Dr. Fairbairn), but the almost unanimous voice of American and Continental writers would lead one to consider the gonococcus blameworthy in the vast majority of such cases. Professor Munro Kerr points out also that even where the gonococcus is the primary infective agent the main damage to the tubes is the work of the almost inevitable secondary infection by the *Bacillus coli*. Venereal diseases are discussed in detail in an interesting special chapter by Dr. David Watson. With regard to the vexed question of chronic endometritis the view expressed is that, in addition to the true inflammatory "interstitial" form, a "glandular endometritis" of infective origin is also sometimes found. This we believe to be more consistent with general experience than the extreme position taken up by some recent writers.

A practical and adequately full discussion of uterine tumours is followed by chapters describing the infections and new growths of the tubes. The chapter on ectopic pregnancy is one of the best and most practical in the book, and deals very fully and lucidly with the great difficulties that may be encountered in making the all-important diagnosis of this condition. Affections of the peritoneum and cellular tissue and diseases and new growths of the ovary occupy the next two chapters; finally there is a brief discussion of such renal, ureteral, vesical, and bowel diseases as may complicate or simulate conditions more strictly gynaecological.

The second part consists of a single chapter on the medical treatment of gynaecological affections, including electrical and radiological methods. In the treatment of menorrhagia due to subinvolution in women near the menopause, Professor Munro Kerr recommends the Roentgen rays—after a curettage to exclude malignant disease or pre-malignant changes in the endometrium. He reserves his judgement on the treatment of fibroids by the rays; on the subject of radium in cancer also he preserves an open mind tinged with hopefulness for the future developments of the method. Up to date he has not had any actual cure, but he has found a preliminary irradiation facilitate the performance of the radical operation. Dr. Hendry contributes to this section an interesting page or two on the importance of proper diet and the regulation of metabolism in gynaecological cases.

The third part deals with operative gynaecology, and opens with general introductory sections on the preparations for operation, post-operative treatment and complications, and general technique. Special sections are contributed on anaesthesia by Dr. Paton Boyd, and on blood transfusion by Dr. W. Rankin. Thereafter the various minor and major operations are described seriatim. The method adopted is admirable in conception and intention, and only a little less excellent in performance. In the case of each operation two or three drawings of the essential steps are given on the right-hand page, while on the left-hand page is the descriptive letterpress, paragraphed to correspond with the figures. It is thus easy even for a beginner to follow the steps as illustrated, and our only criticism is that in some cases the illustrations are not sufficiently numerous, gaps being left which may not easily be bridged by readers who are unfamiliar with the technique. On the whole, however, both Mr. A. K. Maxwell's drawings and the letterpress are adequate.

In this last section it would seem as though the author had altered somewhat his conception of the aim of his book, for he describes and illustrates several operative methods to which only specialists are likely to resort—for example, the various methods of decollation and bisection of the uterus in difficult cases of pyosalpinx. Baldwin's operation for the formation of an artificial vagina from a loop of ileum seems even more conspicuously out of place, as its justifiability in any circumstances is challenged by some eminent gynaecologists.

Professor Munro Kerr's position and his long experience as a practising gynaecologist are sufficient warrant for the soundness of the doctrine contained in this book. His experience as a lecturer and his reputation as an author provide a similar guarantee of the lucidity of his teaching. It is perhaps the very easiness of his style that gives rise to just a suspicion of desultoriness in parts. The author has confessedly avoided writing a "treatise," and what we mean may perhaps be better conveyed by saying that, compared with the almost photographic precision of outline to which most modern textbooks of a comparable size have, as we think very properly, accustomed us, he has adopted an impressionistic style. Obviously, however, it is an arguable point whether this is to be deprecated; and, whether it be or not, the book remains a notable addition to British gynaecological literature.

[1] *Clinical and Operative Gynaecology.* By J. M. Munro Kerr, Professor of Obstetrics and Gynaecology, Glasgow University (Muirhead Chair); Gynaecological Surgeon, Royal Infirmary, Glasgow, etc. London: Henry Frowde, and Hodder and Stoughton. 1922. (Cr. 4to, pp. 848; 450 illustrations, 12 coloured plates. £2 10s.)

SURGICAL DISEASES OF CHILDREN.

IN his preface Mr. PYBUS says that his book, *The Surgical Diseases of Children*,[2] does not pretend to be a complete treatise, but rather a record of personal experience of the commoner conditions met with on the surgical side of a children's hospital. It is probably for this reason that it is so readable, and that even for those of experience it is interesting and instructive. To the house-surgeon it should be invaluable, for some of its best paragraphs are those on signs and symptoms, their valuation and use in differential diagnosis. Despite brevity, and without sacrifice of definite statement, the author yet manages to convey his sense of the element of uncertainty that occasionally besets the accurate recognition of cases usually simple; the reader will have the more confidence in the positive assertions. The book is divided into twelve sections, which deal in turn with congenital malformations; injuries, including birth injuries, fractures, and dislocations; deformities; cysts and tumours; acute infections; tuberculosis; congenital syphilis; abdominal infections; diseases of the rectum; genito-urinary diseases; surgery of the head; and surgery of the throat, nose, and ear. As, added to these, there is a little introduction on examination and general treatment, it will be seen that the whole ground is pretty well covered. It is notable that of 162 children admitted, 32 per cent. had acetonuria on entry, 25 per cent. had it before operation, and no less than 83 per cent. showed it afterwards. Carbohydrates are administered right up to the time of operation —a meal of porridge and treacle four hours before—and glucose is given by mouth and rectum as soon as possible afterwards.

In relation to congenital malformations generally, it seems that the author is something of an optimist, and that certainly implies the only spirit in which their treatment can be brought to a satisfactory result. The account of spina bifida is clear and well judged. The Spitzy splints for fractures in infants are well figured; they should be better known. Only about forty pages are devoted to deformities, so that the descriptions are a little sketchy, and rickets as a disease of metabolism might well have had more space. Scurvy-rickets has only passing mention. In the chapter on cysts, hygroma appears as a simple affair, and the student gets no hint of the disasters that sometimes attend its course. The pyogenic affections, whether of the soft parts, the bones, or of the joints, are admirably reviewed, and the account of the tuberculous invasions of bones and joints which follows, maintains the continuity of pathogeny and of underlying principle in treatment, as logically it should.

Most of what is written about abdominal diseases is to the point, but some paragraphs are by no means easy to understand. The "treatment" of appendicitis on page 317 has been badly paragraphed or hastily written. Does the author really mean that he would postpone operation when peritonitis is spreading, and leave the initial focus? If so he has returned to the German and French practice of twenty years ago—and perhaps he is right.

The section on genito-urinary troubles is quite adequate, and that on the tonsils, adenoids, and the mastoid sound. Formal circumcision is said to be "rarely necessary" and an incision of the prepuce along the dorsum all that is wanted. Does this not often leave a pendulous and useless piece of tissue?

The volume as a whole is so satisfactory, so compact, so pertinently illustrated, that a second edition is sure to be needed very soon. So good a book deserves a more careful proof reader; it is doubtless pedantic "to never split" an infinitive, but the verb should agree with its subject, and relatives deserve respect. However, students are not grammatical purists, and there is ample reason to recommend the book to them heartily.

PENAL DISCIPLINE.

AFTER thirteen years of official life as H.M. Inspector of Female Prisons, Dr. MARY GORDON has given earnest expression to the conclusions she has reached on our present penal methods and their results in a book recently issued under the title of *Penal Discipline*.[3] The book will undoubtedly be widely read and discussed, and the more widely the better. Vigorous, racy, at times poetical in language, and throughout imbued with an active living sympathy for the derelict and diseased, it is the work of one who sees her fellow man or fellow woman even in the most abandoned criminal or "old lag."

We propose to give an account of Dr. Gordon's line of argument, and to reserve any words of criticism for the end. She tells us that in her conversations with prisoners in their cells they spoke about "topics that made life real to each of us—of men, or children, or drink; of money, or bets, or debts; of revenge, or of unlawful acquisition of lovers, or clothes, or of the sport of evading citizens' duties, or the police." So, to quote her own words, she "hunted the souls of others round their prison cells, and out at the doors, and under the proud waters that had gone over them, or over the mountain tops that had baulked them, and so back to their prison again." Those who have breathed prison official atmosphere for any length of time will not be surprised, therefore, at her statement that at her first round of inspections she unwittingly provided a sensation in several prisons, and also that, as an official, she fears she was never true to type. An imperfect official Dr. Gordon evidently was and must ever remain. It is to be doubted, however, whether outside the world of subordinate officers the perfect official exists; the higher and better the official, the less likely are humanity and sound common sense to be strangled in the coils of red tape. The book, however, is not a criticism of officialdom. Dr. Gordon sets out with the proposition that the prison system, with its principle of penal discipline, has not been made by the administrative body, but by the people of this country, citizens and voters. If, therefore, as Dr. Gordon avers, she found nothing in the prison system to interest her except as a gigantic irrelevance, a social curiosity; if she failed to mark a good effect on any prisoner, but, on the other hand, had no shadow of doubt either of the power of the system to demoralize or of its cruelty; if, as she says, we not only do not deter but actually make over the criminal to crime; and if, as is implied throughout, the whole system is futile and unscientific, the author lays the blame at the door of the public and not at that of its servants.

Dr. Gordon holds that the belief that punishment—that is to say, punishment by imprisonment—deters from crime is an assumption in large measure unfounded. She admits that "bodies of persons may be, and indeed are, deterred by the punishments they have ordained as the result of their findings," and that "those to whom imprisonment does represent a disgraceful and real punishment, on the whole take care not to incur it"—that is, if we take her rightly, the threat of imprisonment deters only the lawfully minded citizens who in the main do not require it, and affects hardly at all those who have actually experienced it. As one of the chief justifications for inflicting punishment is its deterrent influence, this is a serious statement. The great and steady diminution in the prison population of recent years is to be explained otherwise, Dr. Gordon suggests. She points out that, taking at random the years 1909 to 1914, while the number of men sent to prison during that period fell by 41,696, certain degraded offences—for example, rape, defilement of girls, procuring abortion, etc.—increased both relatively and absolutely. Her argument, we take it, is that the nature of the offences for which imprisonment has been awarded, rather than the total number of offenders sent to prison, truly reflects the actual position. The local prison for the petty offender, according to her experience, soon becomes a model lodging-house, a place of recuperation for another "bust," and a manufactory of "recidivists"; if it be a fact that imprisonment and the threat of it do not deter from crime, then the system must be an "expensive absurdity."

Dr. Gordon is on surer ground when she describes the effect of imprisonment on the imprisoned. In a chapter on "Systems and their fruits" she deals with results, and makes the striking statement that, whilst of 14,557 women in local prisons only 1 in 766 was punished for violence, and in convict prisons 1 in 26, no fewer than 1 in every 2 girls in Borstal and Aylesbury was so punished and 1 in every 8 had to be put in irons. This was in 1921, which Dr. Gordon says was an exceptional year. Of the Borstal boys, who were five times as many in number, only 1 in 226 was put in irons—a contrast which we cannot pretend to explain. Dr. Gordon does not question that the conduct of the girls was bad, but in the next chapter, on "Psychical considerations," she propounds a reason for their badness.

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[2] *The Surgical Diseases of Children: A Handbook for Students and Practitioners.* By F. C. Pybus, M.S., F.R.C.S. London: H. K. Lewis and Co. 1922. (Demy 8vo, pp. xviii+408; 238 illustrations. 18s. net.)

[3] *Penal Discipline.* By Mary Gordon, L.R.C.P., L.R.C.S.Edin., L.R.F.P. and S.Glasg., late H.M. Inspector of Prisons and Assistant Inspector of State and Certified Inebriate Reformatories. London: George Routledge and Sons, Ltd.; New York: E. P. Dutton and Co. 1922. (Demy, pp. 238; illustrated. 7s. 6d. net.)

Modern psychology is largely based on a study of the primitive instincts and emotions, whereas a prison, Dr. Gordon says, has no use for the emotions. "The prisoner's part is to do as she is told and *consume her own smoke.*" In the words which we have put in italics Dr. Gordon sees the effective reason for much of the badness she finds in the Borstal prisoner. Repression of normal instincts and of acquired tastes and cravings; emotional conflicts; fantasy formation, fostered by long solitudes as the only escape from a cast-iron machine, and the development of an underground mental life detached from a reality in which she has lost all interest, in the author's view, play their part in the moral and intellectual deterioration of the long-term prisoner. The result of her observations has convinced her that of those known in prisons as "feeble-minded" the vast majority are cases of hysteroid or paranoid psychoses. While she admits that all such do not originate in prison, she seems to consider that, in most cases, our penal system is responsible.

It is probably true that, in all but a few, long imprisonment maims as surely as the forfeiture of a limb, by undermining the prisoner's self-respect, initiative, and resource; thus he may become unfitted for the struggle for existence which awaits him outside the prison walls. The lectures, debates, and concerts which are now part of the prison system, the weekly summary of news read by the governor or chaplain, to which innovations reference is made in the Prison Commissioners' Report just issued, are all to the good. They furnish food for the mind but do little to improve the character. If, as has been suggested, an understanding with trade unions can be reached which would enable prison authorities to obtain partial access to the outside market, or if such a system of employing prisoners on a remunerative basis, as Dr. Gordon found in French prisons, were introduced, much of the repression of normal activities, the emotional conflict, and the final apathy and mental deterioration which may attend prolonged imprisonment would perhaps disappear.

Dr. Gordon finds nothing good in the whole of our existing prison system. "Penal discipline," she says, "must go." Instead she would institute "sufficient control to prevent offences, combined with scientific treatment of the prisoner's symptoms, that is, of his crime." Although it is never so stated in terms, it is not unfair to deduce from this that the author generally regards the criminal as a sick person and not as a wrong-doer. Pushed to its logical conclusion the argument of her book is really for a changed public attitude to the criminal, who is to be treated scientifically but neither punished nor reproached. Yet, strangely enough, Dr. Gordon notes the salutary effects of smart punishment on the petty offender. Punishment, even imprisonment, does, in fact, deter. "Control," to be effective, must have power behind. However deeply one may disagree with the author's sweeping condemnation of penal discipline, her book opens up many avenues for speculation and is bound to stimulate and beneficially influence reformative work.

A GERMAN HISTORY OF MEDICINE.[4]

THERE is an idle notion that scholars are dry, dull creatures whose studies have little relation to the real world. The estimate is born of misunderstanding and nursed by ignorance. We conceive that no one to whom has come the privilege of contact with a great scholar can doubt that the qualities which make for success in scholarship would raise a man to eminence in most walks of life. Only direct personal intercourse with such men can reveal the self-discipline, the energy and initiative, the power of organization, the alertness and devotion that go to make up a great work of scholarship. The German history of medicine here reviewed is the joint product of the work of two men who have exhibited these qualities in full measure. Professor Pagel, the founder of the work, died somewhat prematurely in 1912. Professor SUDHOFF is happily still with us, and is approaching the 70th year of his life.

Julius Leopold Pagel (1851–1912) was the son of a poor Jewish teacher in Eastern Pomerania. He went early to Berlin for his medical education. Without money or friends he soon made his mark, and while earning his living as a busy and successful general practitioner he yet found time to make considerable additions to the science of medicine. A man of extraordinary intellectual energy and tireless industry he read very widely and exhibited from the first a strong taste for historical study. His broad, tolerant, good-natured outlook and happy literary style especially fitted him for such work, while his great facility as a linguist gave him access to an unusual number of languages both occidental and oriental. He combined with all these qualities exceptional powers as a teacher. The work of such a man was bound to be readable, balanced, and erudite. In spite of his remarkable combination of qualities it was not till 1898, when 47 years old, that Pagel earned any academic recognition, and he did not get the title of professor—and even then it was little but a title—till 1902. No disappointments or failures deterred him, and he continued to turn out a mass of first-class historical work during the remainder of his life.

The keynote of Pagel's writings is their wisdom. He is among the sanest and most far-sighted of historians, his learning never conceals his vision, his opinions are never violent or fanatical, his treatment of a subject is always well proportioned. His book remains perhaps the best single volume history of medicine. Its weak points were certain inaccuracies in detail and indifferent bibliographical records.

The choice of Professor Sudhoff to edit Pagel's book was fortunate. All who follow the output of work on medical history know him for one of the leading living medical historians. His activity is immense and his erudition is combined with the high standard of accuracy demanded by scholarship. His published writings fill a whole shelf and each one of them exhibits originality. This is the second edition of Pagel's work that has passed through Professor Sudhoff's hands. Pagel's errors have been removed, an excellent and well-arranged bibliography has been prepared, and much of the work has been rewritten without changing the original form. Professor Sudhoff has been helped by that promising young Swiss historian, Dr. Henry Sigerist of Zurich, whom we are glad to remember as a student in this country and a guest at the recent International Congress of the History of Medicine in London.

Some may criticize the volume for the comparative compression of the most modern period—a characteristic of all histories of medicine except that of Garrison. The fact is that the qualities needed for the writing of the medical history of the last fifty years are very different from those demanded of the historian of the earlier period. The ideal history of medicine will perhaps be written by two men, one who will treat the subject down to the time of Pasteur and Lister, and the other the period beyond.

Professor Sudhoff is a German of the Germans and as hard a hitter in controversy as a man may be. There could be no doubt on which side a war between England and Germany would find such a man. But clean hard fighting has never been a quality which has earned the dislike of Englishmen, and if he could pay a visit to England he would find fewer enemies than he expected—or hoped for! In the meantime this book, which is generous to a fault in its treatment of English work, confirms his reputation with all scholars. Whatever personal differences may separate men of learning one from another, learning itself ought to be completely international.

THE ELECTRICAL ACTION OF THE HUMAN HEART.

THE late Dr. AUGUSTUS WALLER had intended to publish in 1914 the lectures he gave in 1913 in the Physiological Laboratory of the University of London. They have now—by the care of his widow, whose death so soon followed his—been brought out, with a preface written this year, under the title *The Electrical Action of the Human Heart.*[5]

Of the four lectures, the first gives an account of his demonstration in 1889, before the International Congress of Physiology at Bâle, of the data, arguments, and conclusions concerning the electrical changes in the human heart as shown by Lippmann's electrometer. The second lecture, describing a demonstration given in 1894, followed Einthoven's invention of the string galvanometer and his introduction of the alphabetical rubric P.Q.R.S.T. for the waves and wavelets of the normal electro-cardiogram. Of this improvement Dr. Waller remarked that the galvanometer is to the capillary electrometer as a high is to a low power of the microscope, that it opened a new chapter in the clinical study of heart disease, and has played a part in medical literature that shows no sign of

[4] *Kurzes Handbuch der Geschichte der Medizin.* Von Karl Sudhoff, o.o. Professor der Medizingeschichte an der Universität Leipzig. Dritte und vierte Auflage von J. L. Pagel's *Einführung in die Geschichte der Medizin* (1898). Berlin: S. Karger. 1922. (The price should be ascertained from a firm importing German books.)

[5] *The Electrical Action of the Human Heart.* By Augustus D. Waller, M.D., F.R.S. Edited by A. M. Waller. London: University of London Press. 1.22. (Demy 8vo. pp. ix + 103; 4 plates, 25 figures. 7s. 6d. net.)

its physiological origin. The third lecture, on the form of the electro-cardiogram and its significance, deals with the information gained by the use of the string galvanometer between 1903 and 1913. As the two ventricular peaks are the prominent features of the normal electro-cardiogram, and are preceded by a smaller wave due to auricular contraction, the simpler rubric *a*, V_I, V_{II}, is regarded as more convenient than Einthoven's familiar P.Q.R.S.T., which has no particular meaning, but has been faithfully followed by most clinical writers. The last lecture goes over the same ground in geometrical and mathematical terms, and is followed by a bibliography arranged under the headings of physiology, anatomy, heart sounds, and apparatus, the latest entry being under the date 1912.

Presented mainly in the order of their chronological development, the contents of this volume form a useful footnote to the history of physiological researches which when first undertaken had, like many others that subsequently became the basis of medical work, no obvious bearing on practice. They also provide the last record of an enthusiastic and famous physiologist's labours.

SURGERY OF THE HEAD AND NECK FOR DENTISTS.

To supplement for the (German) dentist the surgical knowledge acquired during his prescribed six months' course of general surgery and to bring within the compass of a single volume the surgical conditions he is likely to meet with Dr. SEIFERT, private tutor in the university of Würzburg, has compiled a Surgery of the head and neck for dentists.[6] At present the dentist's choice is between a general system of surgery and a compendium—the one too full of information and the other (anathema to the author) wanting in fundamental information.

In this volume practically every surgical condition of the head and neck is dealt with and the main points of pathology, diagnosis, and treatment are briefly but clearly outlined. The dentist whose knowledge of the surgery of the head and neck went no farther than the covers of this book would still find himself well equipped for his profession. The author reflects the generally received surgical views of pathology, but, we think, insists too much on syphilis and too little on sepsis as causes of chronic glossitis and subsequent cancer. Reading the book, one gets the impression that in Germany the dentist is expected to deal with a far greater range of disease of the neighbouring parts than in England. The treatment of tongue injury, for example, seems often to fall to his lot. At most the English dentist is brought in as a second adviser to extract a tooth.

The illustrations are many and good, that of congenital torticollis being specially noteworthy. The fact that they are taken from actual cases in the author's practice may account for the unfortunate circumstance that malignant diseases are only illustrated in their inoperable stages.

We can recommend the book to those who are able to read German.

MENTAL NURSING.

DR. RICHARD EAGER has written a small book, *Hints to Probationer Nurses in Mental Hospitals*,[7] which is intended to supply in a small compass the information necessary for the nurse to possess at the outset of his or her training. In the first part the author lays down a number of rules to be observed, gives directions for dealing with the various emergencies which are apt to arise, and outlines the ward duties of the nurse. The second part is theoretical, and consists of an introduction to psychology. Though the author writes clearly on a difficult subject, it is rather doubtful whether this section is wisely included in a book designed for the use of a nurse in the first few months of training. We should have thought there was quite sufficient to engage her attention without being instructed in the meaning of "complexes," the "censor," the psychology of dreams, symbolism, and so on. It would have been more profitable, we feel, to have devoted these pages, not to rather unnecessary theory, but to a consideration of those nursing principles which should animate the staff of a mental hospital and are specially necessary in dealing with the insane. The precise and clear directions which the author provides in the first part will, however, be found definitely helpful to the nurse, and the book should be of value to those for whom it is intended.

[6] *Chirurgie des Kopfes und Halses für Zahnärzte.* By Dr. Ernst Seifert. München: J. F. Lehmann. 1922. (Roy. 8vo, pp. 202; 147 figures. 7s. 6d.)

[7] *Hints to Probationer Nurses in Mental Hospitals.* By Richard Eager, O.B.E., M.D.Aberd. London: H. K. Lewis and Co. 1922. (Demy 16mo, pp. 80. 1s. 6d. net.)

NOTES ON BOOKS.

THE eighth volume of the now well-known *Archives of Neurology and Psychiatry*,[8] issued from the pathological laboratory of the London County Mental Hospitals, consists of a series of papers, nearly all of which have appeared elsewhere. It is, however, very convenient to have so valuable a collection brought together in one volume. Of Sir Frederick Mott's nine contributions to the volume perhaps the most important are those on the pathology of dementia praecox. His views on this subject are now well known and have been fully stated by him in our columns; they have commanded the respectful attention of all who take interest in this very common mental disorder. That his opinions appeal more to the pathologist and to the student of endocrinology than to the psychologist may perhaps account for some of the criticism they have provoked. The many beautiful plates which illustrate these papers do much to enhance their interest and value. We are glad to see that Dr. Golla's Croonian lectures on the objective study of neurosis are included in this volume, for they will come as a welcome relief to many who have grown somewhat tired of being compelled to look at this problem from the purely psychological angle only. Now that the bequest of the late Dr. Henry Maudsley has been utilized in the establishment of the hospital bearing his name and doing the work he wished to see done, we may look forward to further contributions towards the elucidation of the many problems, both mental and physical, which still await solution by the scientific investigation of mental disease. In the creation of a wider interest and in the dissemination of new discoveries we have no doubt that these *Archives* will play a worthy part.

Sir R. H. FRITH, whose name is well known as the joint author of an important textbook of hygiene, has occupied some of his leisure since retiring from the Army Medical Service in writing a Christmas gift book, *Birds and Blossoms*,[9] which possesses the merits of being original and inexpensive. For each month of the year he has composed a little essay on the sights and sounds of that month, and each is illustrated by clever pen-and-ink sketches, mostly of birds. There are also four coloured plates of the flowers of the seasons. The author has an observant eye and a ready pen; he is an optimist and has a good word even for November. His book will appeal to Nature lovers, and will open the eyes of the boy or girl who receives it to what is going on in country lanes and city parks, so making more Nature lovers, to their life-long happiness.

The new volume[10] of the Edinburgh Veterinary Series from the pen of the Principal of the Royal (Dick) Veterinary College deals with the thorax and abdomen of the horse. It is an account which impresses the reader by its accurate and scholarly descriptions. The description of the thorax will be found to be particularly good, that of the heart and the great vessels being excellent. The abdominal contents are well done, and both parts are adorned by Mr. J. T. Murray's illustrations. Those familiar with his work in Cunningham's *Textbooks of Anatomy* will readily recognize an old friend, and will see that he has now done for the horse what he first did for man.

The *Life and Times of Ambroise Paré*, which Dr. PACKARD published through Paul B. Hoeber of New York a year ago, is now published in this country by the Oxford University Press (London: Humphrey Milford. 1922. Price 28s. net). The only difference between the two issues is that the Oxford University Press has prepared a new title-page. The book appears to be printed from the American plates. It was reviewed in our issue of December 3rd, 1921 (p. 949). In the same way Sir JOHN HARINGTON'S English version of the *Regimen of the School of Salernum*, published by P. Hoeber in New York in 1920 and reviewed in our columns on February 12th, 1921 (p. 231), has been taken over by the Oxford University Press (price 14s.). We mentioned recently that Hoeber's edition of the *Gold-Headed Cane* will in future be published in this country by the Oxford Press (price 16s.).

[8] *Archives of Neurology and Psychiatry, from the Pathological Laboratory of the London County Mental Hospitals, Maudsley Hospital, Denmark Hill.* Edited by Sir Frederick W. Mott, K.B.E., M.D., F.R.S. Vol. viii, 1922. London: P. and S. King, Ltd. (31s. 6d.)

[9] London: Ba'e Sons, and Danie'sson. (8×11, pp. 32. 2s. 6d.)

[10] *The Topographical Anatomy of the Thorax and Abdomen of the Horse.* By O. Charnock Bradley, M.D., D.Sc., M.R.C.V.S. Edinburgh: W. Green and Son, Ltd. 1922. (Sup. roy. 8vo, pp. xii + 204; 85 figures. 21s. net.)

Nova et Vetera.

SPOLIA NEMORALIA.

*(SHRUNK HEADS, EAR-PLUGS, AND LABRETS.)**

BY

SIR JOHN BLAND-SUTTON, F.R.C.S.,

CONSULTING SURGEON TO THE MIDDLESEX HOSPITAL.

INDIANS living in the dense forests bordering the section of the Amazon called the Marañon have acquired notoriety in preparing what are known in England as "shrunk human heads." While on a visit to the Amazon I got some of these curious heads and have been able to examine them critically, and also obtained some stories concerning the Indians.

Recently G. M. Dyott made an adventurous journey across Peru to Iquitos. After being treacherously abandoned by his guide on the return journey, he was rescued by some Aguarunas. Dyott, virtually a prisoner for many weeks, won the confidence of the Indians, and they helped him to reach Lima. While with the Indians he acquired some knowledge of their language, the secrets of the community, and a first-hand knowledge of their customs. These he described in his book entitled *The Silent Highways of the Jungle* (1922).

THE AGUARUNAS: SHRUNK HEADS.

These Indians are well formed, with coppery skins and long raven-black hair, which is cut into a fringe across the forehead. The men average in height 5½ ft., the women rarely exceed 5 ft.

The men are clever hunters, use the blow-gun skilfully, and can hit a monkey, as it jumps from tree to tree, with the poisoned dart. They live on bananas, mandioca, and fruit. They also eat fishes, tortoises, sloths, monkeys, small wild pigs, and birds, especially toucans and parrots. The women are drudges; they collect, prepare, and cook the food. The men hunt and fight; in their hours of ease they amuse themselves spinning thread from wild cotton, and weave the material for the scanty clothes they wear.

In civilized countries human beings wear clothes for decency, protection against weather, and for warmth. With the Aguarunas decency does not count. Their scanty clothes protect them against insects and thorns. When it rains they take off their clothes, carefully fold them, and use large palm leaves to keep themselves dry.

The Indian (Fig. 1) shows well the luxuriant growth of hair and its arrangement. This boy is equipped for accompanying his father in the forest. The quiver, made of bamboo, contains light wooden poisoned darts, slender as knitting needles; the gourd attached to it contains a supply of wild cotton, which is used for adjusting the darts to the lumen of the blow-gun.

FIG. 1.—Aguaruna boy equipped for accompanying his father in the forest. (From a photograph by G. M. Dyott.)

The pointed tip of a dart is smeared with woorali, the South American arrow poison. A mere scratch of the skin made with the tip of such a dart is quickly fatal, but a moderate quantity of woorali may be swallowed without harm. The flesh of a bird or an animal killed by a poisoned dart is eaten without danger.

The Amazonian Indians are familiar with the process of mummifying dead bodies. As a rule a corpse is flung into the river, but when killed in combat the body is mummified, wrapped in bark, and placed on a stand in the centre of the hut as an object of veneration. Some notion of their methods of mummification may be gathered from the way these Indians treat the heads of victims slain in combat. The conqueror cuts off the head, splits the scalp by a vertical incision in the occipital region (Fig. 2), and neatly removes the skull with the brain, eyes, muscles, jaw, and tongue, leaving the skin of the face and the scalp intact. The incision is closed with a continuous stitch and the cutaneous bag is packed with hot pebbles, or hot sand, and carefully dried in the sun. When this crude taxidermic process is complete the skin shrinks to the size of an orange, preserving the features. The lips are stitched together with threads, which are left long, and dyed red in such a way as to present alternate bands, coloured and uncoloured (Fig. 3). The lips are sewn together to prevent the victim retorting when his conqueror freely curses him, and to condemn him to eternal silence! A cord is attached to the vertex of the scalp to enable the trophy to be slung on the girdle of the warrior. Some of the cords are decorated with scarlet feathers. The skin of the face is smoked, polished, and sometimes smeared with red dye.

There are two shrunk heads in the Natural History Museum, South Kensington, probably the first examples seen in London. They were shown to the Anthropological Society, Paris, in 1862, by Dr. Moreno-Maiz, formerly surgeon-in-chief of the Peruvian army. He presented them to the museum. The heads were given to Moreno-Maiz by M. Galvey, the Peruvian Minister in Paris; they were found in an Inca tomb in the territory occupied by Jivaros Indians (Ecuador). Moreno-Maiz appreciated the heads as excellent examples of taxidermic art, detected the manner in which the skull had been removed, and the skill with which the shrinking had been carried out with conservation of the features. Dr. Bellavisencio examined pieces of the mummified skin histologically; sweat glands and their ducts, hair bulbs and sebaceous glands, and the layers of epidermis were easily recognized.

The heads were those of Jivaros warriors, and were probably preserved from religious motives, for these Indians did not bury the heads of the dead with their bodies in cemeteries, but after conservation placed them around their houses and preserved them with respect, for these cherished remains protected the families from their enemies. For these Indians death was not a natural phenomenon—it was a consequence of witchcraft, the occult and culpable action of enemies, known and unknown. Bollaert published a good account of the Jivaros Indian in 1863.

The knowledge of this peculiar method of preserving heads has come down from the Incas of Peru. The body of a deceased Inca was skilfully mummified and removed to the great Temple of the Sun at Cuzco. The Peruvian sovereign on entering the sanctuary of the dead might behold the effigies of his royal ancestors ranged in opposite files—the men on the right and the queens on their left. The bodies, clothed in the princely attire which they were accustomed to wear, were placed on chairs of gold, their faces exhibiting the natural dusky hue, their forms and lineaments true to life (Prescott). Garcilasso saw them (1560) and described them as "perfect as life without so much as a hair or an eyebrow wanting."

Mummified Incas were treated with reverence, but to-day Indians living in the seclusion of the dense forests are described as devoid of emotions such as love, pity, admiration, wonder, and joy. They are superstitious, and superstition is born of fear of spirits, good and evil. It is difficult to believe, as some assert, that Indians lack imagination, when they practise the diabolical art of curing the skin of an adversary's head, shrink it to the size of a lemon, preserving the features, even the eyelashes and eyebrows, and sew the lips together, so that when they curse the victim the leathery lips can make no reply. *Surely belief in spirits, good and evil, depends on the faculty of speech.*

In London there is now a fair number of these curious heads available for study. In addition to the two in the Natural History Museum the Royal College of Surgeons possesses six, the British Museum three, as well as a collection of hunting and domestic implements used by the Peruvian Indians. The Wellcome Historical Medical Museum contains

* An address given at a social meeting of the Royal Society of Medicine on November 8th, 1922.

FIG. 2.—Shrunk head of an Aguaruna. The hair has been removed from one side to afford a view of the scalp and to expose the line of the incision, which permits the extraction of the skull (half natural size). The material used to sew the lips together is twisted cotton thread. The scalp is slung by a plaited loop.

FIG. 3.—Shrunk head of an Aguaruna (half natural size). The hair is coarse like that of a mane or tail, raven black, and two feet in length. (Museum, Royal College of Surgeons.)

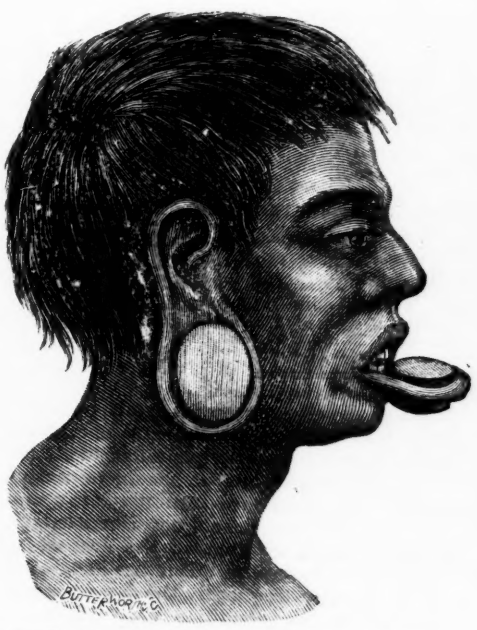

FIG. 4.—Head of a Botocudo with ear-plug and labret.

FIG. 5.—Head of Gotos Indian with ear-plugs (A. Miles Moss).

thirteen examples, and there are many kept as curios by travellers. When a demand for such heads arose many were forthcoming, but traffic in these gruesome curios is discouraged lest it lead to undesirable methods of obtaining them.

EAR-PLUGS AND LABRETS.

When Columbus discovered Honduras during his fourth voyage (1502) he named part of the seaboard "Costa de la Oreja," in reference to the ears of the natives enlarged with plugs. The Indians inhabiting the forests wear ear-plugs and labrets. Some of the tribes were named by the Portuguese "Botocudos" on account of this habit, *botoque* being the Portuguese name for a plug. The ear-plugs of the Botocudos are sometimes four inches in diameter. There are plugs of this size in the British Museum, and they resemble bungs. The plugs can be slipped in and out of the loops like buttons. Some ear lobes are so distended with huge plugs that they reach to the shoulders and resemble the wings of bats (Fig. 4).

Drs. Spix and Martius, in 1817, under the auspices of the King of Bavaria, made a journey for scientific purposes through the Amazonian forests. Spix was responsible for zoology and Martius for botany. They subsequently wrote an instructive book entitled *Travels in Brazil*. The first native American they saw was a boy of the cannibal race called Botocudos. He was in the house of M. von Langsdorff. The story of the boy is curious. A former Minister of State had applied to the district commander for an Indian skull which he required for Professor Blumenbach. The commandant had no opportunity for obtaining a dead specimen, so he sent two living Botocudos, who had been taken in a sudden attack by his soldiers. Von Langsdorff obtained one of them, to whom he soon became much attached, and "who served him not only as a living cabinet piece, but as a collector of objects of natural history." This boy wore not only ear-plugs but also a large labret.

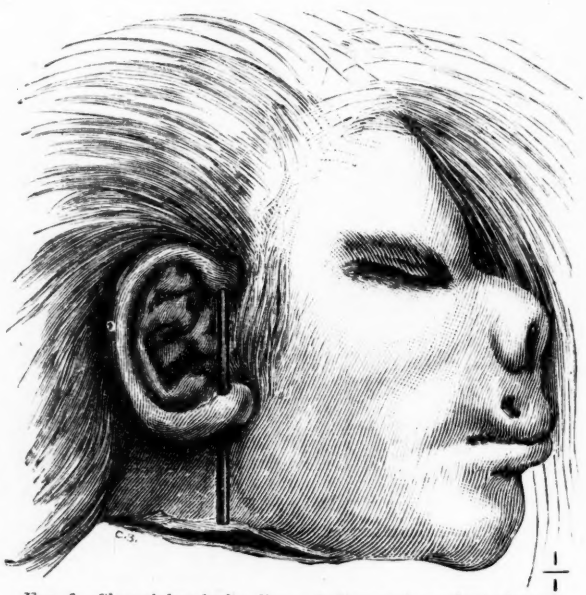

FIG. 6.—Shrunk head of a Jivaro Indian with a spigot of wood in the lobe of the ear.

Ear-plugs are instructive in regard to the view that the method of mummifying heads is of Incarial origin. The heir to the Inca throne received a military education with the sons of the nobles. At the age of 16 they were submitted to a public examination in order to show their prowess in the athletic exercises of warriors.

They were admitted into the order of chivalry by the Inca in the following manner: the novice knelt before him and he pierced the lobe of the ear with a golden bodkin, and this hole was gradually dilated until it became large enough to receive an ear-plug. "This monstrous deformity was regarded as a beauty by the natives" (Prescott).

The ears of shrunk heads sometimes contain a wooden spigot in the lobule (Fig. 6). The Royal College of Surgeons contains two examples, and I think this is peculiar to the Jivaros (Ecuador). There is a shrunk head in the British Museum, with preserved skins of brightly coloured birds hanging as ornaments from the lobe of each ear. Gorgeous plumes of feathers are worn by the men on festive occasions.

It is clear that there are two kinds of shrunk heads—one from enemies slain in combat and the other heads of chiefs. The former are freely cursed by their captors; the latter, decorated with iridescent wing-cases (elytra) of large beetles, bright-coloured feathers, and skins of gaudy birds, are venerated and worshipped as idols.

The Rev. Arthur Miles Moss (1909) made a journey for entomological purposes into the forests of Peru, and succeeded in recovering some photographs, obtained by Mr. Kroehle, of Indians living along the tributaries of the Amazon. Some of these photographs show Gotos Indians with ear-plugs (Fig. 5). Kroehle lived for some time among the Indians and received an arrow wound which "hastened his death." On the back of a photograph is written the significant word, "Anthropophagus."

Spix and Martius reported that the Botocudos were cannibals.

Opportunities for seeing Indians in Brazil with ear-plugs and labrets are rare. In British East Africa they are common, especially among the Masai and Kikuyu. These deformed ears are objects of great pride to their possessors and the envy of their neighbours. To break the loop is an insult. When men quarrel they snatch at the ear-loops and try to break them. If the loop is completely detached the damage is irreparable, but if merely broken it is mended in the following way: the torn ends are cut so as to leave sloping surfaces; the freshened edges are then superimposed and held in position with the finger and thumb until bleeding completely ceases. The apposed ends of the loop are bound together with a strip from a leaf, a blade of grass, or a piece of bast, and union quickly follows. Each tribe has a man who performs these operations. Without the plug the large ear-loops resemble rubber rings, and the men loop them over the helix for protection.

It is clear that Amazonian Indians, as well as the natives of East Africa, like surgeons in civilized countries, are familiar with the elastic properties of human skin.

Shrunk heads, ear-plugs, and labrets appeal to me. My father taught me to stuff birds at the time my mother stuffed me with the creed and ten commandments. Later in life I saw savages ornamented with feathers, skins, teeth, and claws in tropical forests; similar decorations are worn by fashionable human beings who strut in Piccadilly or parade the paddock at Ascot.

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REPLACEMENT OF CARS: INCOME TAX ALLOWANCE.

THE replacement of a medical practitioner's car frequently raises questions which are not only somewhat involved, but also affect substantially the amount of income tax to be paid. We propose to deal briefly with the matter in general terms in the hope that a few notes may be of assistance to our readers.

The key to the solution of most of the problems lies in a grasp of the distinction between current expenditure and capital outlay; the former is allowable for income tax purposes, but the latter is not. To take a simple case, suppose a medical man setting up in practice for the first time purchases a car—obviously the cost represents capital outlay; and if a second car is purchased while the first is retained in commission, that expense is precisely similar in its nature. On the other hand, if the second car is bought to replace the first, then the cost of the second car—assuming it is a similar one—less the amount allowed for the old one, represents the current expense of maintaining equipment the cost of which has already been charged to capital. But the facts are seldom as simple as this, because frequently the second car is a better one in grade, power, or condition than the one which is replaced, so that both maintenance and improvement are effected by the one transaction, and then the cost has to be divided accordingly into allowable and capital portions—or, to put the point another way, there has been a real addition

to the original capital outlay, and that addition must be excluded from the total expense for income tax purposes. Assuming for the sake of simplicity that motor prices have remained constant, the adjustment would work out thus:

In 1918 car "A" was purchased at second hand for (Original price of car was £500.)	... £250
In 1921 car "A" was sold for £150, and car "B" was bought for	... £500
Net cost of new car = £500 *minus* £150	= £350
Amount of capital—that is, improvement—cost £500 *minus* £250	= £250
Allowance for income tax purposes	... £100

Unfortunately for the calculation, motor car prices have not remained constant. The fact that a car bought as a renewal cost more than the car displaced does not at all necessarily imply that it is in any way superior—it may, in fact, be the opposite—but the local inspector of taxes may ignore this special factor and propose to treat the increase in cost as representing further capital outlay. If that increase were likely to be permanent, there might be a good deal to be said for that argument; but, whatever the merits or demerits of the technical question may be, they are, fortunately, only of academic interest, as the matter has been the subject of an authoritative statement. When official evidence was being tendered to the Royal Commission on Income Tax on behalf of the Board of Inland Revenue on the subject of the allowances made for the replacement of machinery and plant—and it is on that footing that motor cars used for professional purposes are dealt with—it was explicitly stated that when replacement was effected by a similar machine at an increased cost the whole of that cost, less the amount received for the machine displaced, would be allowed; and, further, that where an improved machine was purchased the net cost would be allowed up to the amount of the expenditure that would have been incurred if a similar instead of a more expensive machine had been purchased. An example may make the point clearer:

In 1916 original car "C" bought for (In 1921 a similar car would have cost £400.)	... £300
In 1921 a superior car "D" was bought for (The car "C" being sold for £150.)	... £500
The net cost of purchase is £500 *minus* £150 =	... £350
The capital outlay is £500 *minus* £400	... £100
The net cost of "replacement" allowable is	... £250

It is on this kind of case that discussions most frequently arise, some inspectors being apparently inclined to treat the capital outlay as the increase in the amount paid for the car —that is, £500 *minus* £300 = £200; and there is the further practical difficulty that there is sometimes no car on the market similar to the old car, in which case the sum represented in the above example by the amount of £400 has to be estimated—a question that is a particularly open one when the car replaced had been purchased at second hand, so that its then condition is an important factor in the problem. If, however, the principle is accepted, the figures can usually be agreed with the inspector of taxes by correspondence or by word of mouth.

It may be advisable to add that in the future falling prices will reverse the facts in many cases, and that a practitioner cannot claim a greater deduction than the net cost of replacing a car, even though the price of the new car is less than the original outlay on the car which he is thereby replacing. For instance, supposing that in the second example given above car "C" is replaced by a similar car "E," costing £250, then the amount to be allowed is the actual out-of-pocket expenditure—namely, £250 *minus* £150 = £100.

THE LONDON SCHOOL OF TROPICAL MEDICINE.

THE annual dinner of the London School of Tropical Medicine was held on November 1st, under the chairmanship of Dr. HUGH STANNUS, a former student. Many past and present students and members of the staff were present; among the guests were Sir William Leishman and Sir George Newman and Sir Arthur Robinson of the Ministry of Health.

The CHAIRMAN, in giving the toast of the School, said that this year they had to mourn the loss of the man who conceived the idea of a tropical school in London. The genius of Sir Patrick Manson had been recognized in every country, and the results of his work were reflected over a great area of the globe. Students who came under the spell of the man himself would remember him as the grand old man of tropical medicine, who was above all things himself a student, a seeker after truth, a keen investigator, a man of courage, imagination, and reasoning power. Manson created in the School of Tropical Medicine a tradition which would be an inspiration to many generations. The number of students who had passed through the School had now reached a very large total. The School had established a stranglehold upon disease around the equatorial regions of the earth, and the noose was being drawn tighter every year. The life of the student was strenuous—at one moment invited to plan an incinerator, at another to demonstrate a splenectomy, now examining with the ophthalmoscope the window through which the soul of man looked out, and now with the sigmoidoscope investigating the depths of the internal economy. Into the vast area of tropical medicine specialization had already entered, with its advantages and disadvantages, but it seemed that the walls of division between tropical and general medicine were fast crumbling. The investigation of ordinary diseases among tropical populations would well repay research in the future. The biochemist, again, had hardly touched as yet the fringe of tropical pathology. The practitioner in the tropics must be something of an anthropologist and a psychologist as well, for the mental outlook, the religious belief, and the social custom had to be reckoned with in studying disease.

Proposed Incorporation with the New Institute of Hygiene.

Sir ARTHUR CLARKE, in proposing the toast of the guests, alluded to the negotiations now proceeding whereby the School may become incorporated with the new School of Hygiene in London, founded with the assistance of the generous gift made by the Rockefeller Fund. This matter had given much anxiety to the Board of Governors of the Seamen's Hospital Society, which had seen the school grow up under its care, and had placed it in its present absolutely sound financial position, while its success in teaching and research had been assured by the genius of Sir Patrick Manson and the ability of the teaching staff. If any such change came about it must be because it was in the best interests of tropical medicine and research and of the School itself as the teaching centre.

Sir ARTHUR ROBINSON, Permanent Secretary of the Ministry of Health, said that the question of incorporation with the School of Hygiene was one to which he could not make any extended reference. The essence of the proposal was that there was room in London for a school of instruction and research in public health, interpreting that term in the widest possible sense, national, imperial, and international. That was the conception put to the Rockefeller Foundation, and to carry it out the Foundation had made its magnificent gift. To this the British Government had replied by undertaking to meet the expense of running the institution when established. Progress had been made to the extent that a site had already been secured. The new institution must in any event have a close relation with the London School of Tropical Medicine, and it should if possible, and if it was agreed on all sides, amalgamate with the School. Speaking quite broadly, he would say that any amalgamation must be such as to secure the continuance of the great work done by the Tropical School. That was the fundamental condition. The Ministry of Health had to consider the subject from that point of view, and it was from that point of view that the Ministry had made certain proposals to the Seamen's Hospital Society. The great work of the School, and the fact that it had traditions, formed and forming, must always be kept in mind, and if amalgamation came about everything must be done to preserve the traditions of the Tropical School and to carry on and expand its work as part of the great general work of public health. The proposal was still under consideration, and the Ministry of Health, the Rockefeller Foundation, and the University of London, with which the School of Tropical Medicine was associated, would welcome the amalgamation most heartily if such a solution were found possible. If the amalgamation came about it would be on fair terms, and such as to secure the continuance of the work and to uphold the traditions of the School.

Sir HAVELOCK CHARLES, Dean of the School, said that evidently there was a marriage in contemplation, the bride being the School, and it was only right and proper to consider the marriage settlements, for otherwise the bride did not know what might happen to her once the ceremony was over. The Tropical School was in a first-rate financial condition. All that it required to complete its equipment were laboratories for tropical hygiene. He thought he was expressing the desire of staff and students when he said that if the School was met fairly and well in its aspirations their loyal support of the new arrangement could be counted upon.

British Medical Journal.

SATURDAY, NOVEMBER 11TH, 1922.

THE STATISTICAL METHOD IN PSYCHOLOGICAL ANALYSIS.

In his presidential address to the Medical Society of London[1] Lord Dawson stated his belief that fuller and franker discussion of psycho-pathology within the profession was needed. Although Lord Dawson did not confine his remarks to the particular nexus of theory and practice popularly termed "psycho-analysis," he did refer specifically to that branch of the subject and in terms which, but a few years ago, were unusual. The psychological doctrines associated with the name of Freud have been debated in the columns of the medical press for more than ten years, with irregular epidemic exacerbations. Some six or seven years ago many distinguished members of the profession fell victims; a majority of them used language very different from that of Lord Dawson. Something must be credited to the war-time atmosphere, more to the example of an able polemist who expressed convictions, sincerely held, with more vigour than charity. It is at least certain, as the style of a current controversy testifies, that one obstacle to the discussion advocated by Lord Dawson has been overcome.

But although discussion of this topic is now more courteous—at least in professional journals—and accusations that "psycho-analysts" are corrupters of school children to be restrained by hierarchical authority are no longer popular even in the lay press, we are not sure that much progress towards intellectual agreement has been made. Perhaps a metaphor of Lord Dawson's gives us a clue. He spoke of mental surgery. Before we are in a position to canvass different operative methods we ought to have reached a measure of agreement on topographical anatomy. Sir Clifford Allbutt recently said that "popular psycho-analysis was false science; it had no units, no means of measurement, no separation of objective and subjective evidence," and he stigmatized psycho-analytical interpretations of dreams as "incredible nonsense." Sir Clifford was explicitly referring to popular "psycho-analysis," which we apprehend to be that form reprobated by Dean Inge as "a fashionable craze," especially of "flighty young women"—no doubt the people who have analysed so many school children—but it is pertinent to ask what attempts have been or can be made to apply to serious "psycho-analysis" logical criteria commensurable with those held to be applicable to other clinical procedures. Our grandfathers frequently discussed the diagnosis and treatment of "fevers." If—as may perhaps have been the case—some relied upon the use of a clinical thermometer, which others rejected as a new fangled, unreliable, and nonsensical instrument, there could be no agreement until a preliminary inquiry had settled whether the clinical thermometer was or was not a tool that could be trusted. We seem to be—we speak of the general body of the profession, not of the specialists—rather in this position. There is no agreement as to the precision of the diagnostic tools; this, then, is a point which should first be debated.

These reflections are suggested by an article on the question of the interpretation of dreams by Dr. A. v. Muralt of Zürich which appeared in a recent issue of the *Schweizer Archiv für Neurologie und Psychiatrie*.[2] The problem Dr. v. Muralt set himself was this: If the record of a dream, the associations of that dream and the clinical history of the patient, as elicited by ordinary interrogation prior to the first analytical sitting, are submitted to a series of independent observers, will their interpretations be sufficiently concordant and sufficiently consistent with the subsequent history of the case to justify us in attaching scientific importance to the method of dream analysis? Including his own (written down immediately after the event), Dr. v. Muralt had seven interpretations of the dream, the collation of which has prompted him to write: "My investigation has, in my opinion, provided a proof—a point to which I desire to give special prominence—that different interpreters of the same dream material arrive at similar conclusions, and that therefore the interpretation of dreams is as a method on an equal footing with other scientific methods."

The field of experiment upon which Dr. v. Muralt has entered seems promising, although we cannot endorse the conclusion quoted. The arithmetical assessment of the value of testimony upon which Poisson expended so much mathematical genius did not, perhaps, deserve the scorn of Bertrand nor the more recently expressed contempt of Mr. J. M. Keynes, but it is undoubtedly a process beset with difficulties. If seven persons independently asserted, and correctly asserted, that a card turned up from a shuffled pack by an operator invisible to them was a heart, it might be rational to say that the odds against "chance" were thousands to one. But if beforehand they had read and believed a statement that it was a law of nature that a card turned up by a concealed operator was usually a heart, the seven would be reduced to a unit and the odds be only three to one. Now this argument weakens the value of evidence to which Dr. v. Muralt attaches importance. An incident of his patient's dream was the preparation of a sermon in the dreamer's father's study (the dreamer was a young student of theology, the son of a pastor). Associations with the dreamed incident were: "I have worked a great deal in this study with my father—Papa—I get on very well with him, we have the same ideas." The patient's symptoms were a scrupulosity and an indecision almost amounting to doubting mania. That all seven interpreters, all familiar with the writings of Freud and Jung, should attach significance to the relation with the father is not, we think, at all remarkable. A similar exegesis might be applied to the less complete but substantial agreement between the interpreters on the significance of other incidents in the dream.

The story presents other points of interest. We begin with a patient whose life is a misery to himself. Among the clinical data of the case we have a dream which, on the face of it, is mere nonsense. By the application to this material of certain rules—which, if we please, we may regard as quite arbitrary—certain diagnostic inferences are drawn. The subsequent history of the case is consistent with the truth of the diagnosis. Is the concordance fortuitous? The answer must depend on a knowledge of the frequency with which dream incidents of the type considered occur in the experience of youths not on the verge of mental collapse; the collection and analysis of such data is difficult, but not beyond the bounds of research possible for non-specialist medical men. We are not called upon to enter into the minutiae of the theory; we can begin with the broadest categories of dream types and ascertain their frequency in a normal population. It is hopeless to expect the adepts to do this for us. They, rightly or wrongly, are satisfied that their rules are correct. To apply the numerical method of Louis to this subject is more laborious and less flattering to one's intellectual vanity than abstract disquisition, but it is a scientific method. We recall

[1] British Medical Journal, October 28th, p. 781.
[2] Bd. xi, 1922, pp. 13–33.

the literary history of masturbation, set out in one of Dr. Havelock Ellis's volumes. From the beginning of the eighteenth down to well past the middle of the nineteenth century there was hardly any physical or mental symptom which had not been specifically attributed by some eminent authority to the practice of masturbation. It was not until within living memory that the numerical method was applied to this problem, when it was found that a large proportion (in some samples a very large majority) of apparently healthy adolescents had been or were masturbators. This result certainly did not prove that masturbation was a harmless practice, but it did prove that the etiological significance of the high proportion of masturbators amongst the neurotic or psychotic was dubious. A comparison between the statements on the subject in textbooks of this and of the last generation will bring out the point we are attempting to make.

In our opinion, neither denunciations of the absurdity of the Freudian dream analysis nor pragmatic justifications of its success are adequate substitutes for a statistical verification. The significance of Dr. v. Muralt's paper lies not in its positive contributions to knowledge, not even in the precise numerical method adopted by him, but in the thesis that this problem too should be studied by the statistical method. Dream analysis is, of course, only one of the instruments of the analytical psychologists; it is perhaps the most disputable. But it seems to be one which can be tested in the domain of psychological experience accessible to all of us.

THE SMALL-POX OUTBREAK.

IN an article at p. 943 of our present issue an account is given in detail of the measures which have been taken at and in connexion with Poplar workhouse to control the small outbreak of small-pox within the institution, and to try to prevent its extension outside. The three great measures are: first, vaccination of inmates and of officers, whether resident or not; secondly, search for contacts, with a view to their vaccination if discovered in time to enable vaccine to overtake variola, and surveillance so that they may immediately be isolated if the initial symptoms of small-pox appear; and, thirdly, hospital isolation forthwith of all discovered cases. Needless to say, disinfection and cleansing fall also within the scheme.

Experience indicates that though small-pox may come at any time, its extension is specially to be feared in winter, and we are now at the onset of that season. Also in the present outbreak a virulence of type is manifesting itself of which this country has seen comparatively little for a long time. Small-pox in most parts of Britain has in recent years been very mild, with a remarkably low fatality rate, such as has been experienced likewise in South Africa, Australia, and North America. Whether that strain of infection is now to be displaced with us by the kind of disease which was familiar half a century ago it is impossible to forecast, but there is undoubted cause for apprehension. A third factor in the case is the unprotected condition of a large section of the population, especially at the younger ages, owing to neglect of vaccination. On the other hand, the work of vaccination and revaccination carried out in the Forces during the war has conferred a large measure of protection upon the male adults of the country.

It is very satisfactory that the Ministry of Health is acting with foresight and promptitude. We have received a copy of two memoranda which are being issued, one to boards of guardians as the statutory authorities for vaccination, and the other to sanitary authorities as responsible generally for the public health. Both documents are distinguished alike by intimate knowledge and by common sense. In respect of contacts there is no exhibition of panic. They are not to be isolated either at home or in reception houses, as being capable of spreading the disease before it manifests itself on their own persons; but when the time comes at which the disease is likely to appear, in cases where it may have been incubating, surveillance is to be very thorough. Of course, for common lodging houses, with their casual and constantly changing inmates, special measures would have to be resorted to.

Satisfactory features of the position are that all who are now, in presence of the danger, successfully vaccinated will have the benefit of the recency of their vaccination. If an epidemic should come, it will be well past before the protective operation has had time to lose any of its initial value. Another comforting fact is that calf lymph can be quickly produced in quantity sufficient to meet the most extensive epidemic. That is a position very different from the times when the only source of lymph was from newly vaccinated babies, and when the supply was limited by the weekly vaccinations.

THE FIELD LABORATORIES, SHEFFIELD.

WE publish elsewhere (p. 941) a remarkable address given by Sir Walter Fletcher, Secretary of the Medical Research Council, on a remarkable occasion. The occasion was remarkable for several reasons. In the first place it recalled the generous gift of the Sheffield Panel Committee of £1,000 towards the cost of erecting the Field Laboratories which are under the direction of Dr. Edward Mellanby, professor of pharmacology in the University of Sheffield. The Sheffield Panel Committee is financed, we understand, by a purely voluntary scheme, and when the financial situation was reviewed at the beginning of 1921 it was seen that economies practised had resulted in a considerable surplus, so that not only could the voluntary levy be suspended, but there remained over a sum of about £1,000. At a meeting of the insurance practitioners it was resolved that this sum should be transferred to the University, with a request that it should be earmarked for the equipment of the Field Research Laboratory. Professor Mellanby's department consists of a laboratory for experimental pharmacology at the University and of the Field Laboratories for dietetic experiments. The importance of associating the pharmacology department with clinical work is fully recognized in Sheffield, and Professor Mellanby has been appointed one of the honorary physicians to the Royal Infirmary, where the other physicians have given up 24 beds to him. In the curriculum at Sheffield students take part of the courses in physiology and anatomy, and the course in pharmacology while also doing elementary ward work; in this way it is hoped to bring the methods of the laboratory into closer touch not only with the clinical practice of physicians and surgeons but with the minds of the students also. The hope seems likely to be fulfilled, for students are displaying keen interest in the opportunities afforded to them. Sir Walter Fletcher's address was remarkable for many reasons: for once in a way he took for his subject the importance of medical research work in the daily life of the community. Workers in research, among whom he himself holds so distinguished a position, are too much fascinated by its interest and beauty often to explain themselves to the public, and he asked for the co-operation of practising members of the profession to act as interpreters of laboratory work to the public as they were already prepared to make use of the results of scientific research for the benefit of the public. Very happily he took for the text of a large part of his address the dictum of a one-time Minister who "did not hold with research, but believed that if disease was to be stopped the people must have better grub and less dirt." The fact that the occasion of the meeting he was addressing was the examination of some of the work Professor Mellanby is doing with regard to

deficiency diseases afforded an illustration to his hand of how "better grub" is to be provided, or at any rate of how its goodness in the promotion of growth in children and the prevention of disease in man can be judged by such researches as those now being carried out at Sheffield. The effects observed, under rigid conditions, of the withdrawal of vitamins are so astonishing that it is almost true to say that they must be seen to be believed, but no one who has seen them can doubt that a deficient supply of vitamins, short of their total withdrawal, must produce depressing effects on nutrition, retarding growth and predisposing to disease. Sir Walter Fletcher touched very lightly on the surprising new work on photo-synthesis, which appears to show that direct sunlight, or even artificial light of a suitable kind, falling upon the skin, can stimulate the production of vitamins, or in some way make up for the want of them. We will not attempt to forestall the pleasure members will have in reading Sir Walter Fletcher's address, but we may express our sympathy with his humorous defiance of the people who, when told of a new thing, begin by saying it isn't true, and eventually assert that they knew it all the while.

THE LEAGUE OF NATIONS AND THE TRAFFIC IN DANGEROUS DRUGS.

The third Assembly of the League of Nations, held at Geneva in September, 1922, received a report from its Commission on the Traffic in Opium and Dangerous Drugs. From this it appears that Persia, Albania, Argentina, Colombia, Costa Rica, Esthonia, Luxemburg, and Paraguay have not yet unreservedly ratified the Opium Convention of 1912. Switzerland is expected to ratify by the end of this year, and it is hoped that Persia may shortly withdraw the serious reservations hitherto made. Turkey, of course, is still outside the League and the Convention. Very little progress has been made with the effort supported by the Advisory Committee to secure a system of Government certification from importers of these drugs, to the effect that the consignments are to be used for medical or legitimate purposes only. The success of such a system, it is recognized, is entirely dependent upon its general adoption, and no fewer than twenty-six States, members of the League, have not yet adopted it, although that system was unanimously approved by the second Assembly. A resolution was passed by the third Assembly, on the recommendation of the Commission mentioned above, inviting Governments which are parties to the Opium Convention to refuse licences for import of the drugs to any country which has not ratified the Convention and adopted the system of licence control of exports and imports, subject to the Advisory Committee reporting favourably to the Council on the proposal. The Provisional Health Committee of the League, which was last year requested to report on the amount of morphine, cocaine, heroin, etc., required in different countries for legitimate medical purposes, has not so far vouchsafed any definite results, and a request has been made to all Governments parties to the Convention to furnish estimates of their annual requirements of these drugs as speedily as possible, accompanied by a statement of the method by which the figures are arrived at. It is thus hoped that a provisional estimate of the world's legitimate consumption of the drugs may be arrived at and the way opened for the control of their production. The Commission observes that "as long as the dangerous drugs are produced in quantities exceeding the legitimate requirements, a great danger exists that the surplus will find its way into illegitimate channels. A control of production so as to limit it to the amount required for medical and legitimate purposes will therefore be the most effective way of putting a stop to the illicit traffic." This view has been emphasized in these columns for the last ten years, and we are gratified to find it adopted as a basis of policy by the League of Nations. The Commission recalls that the Opium Convention (Chap. II) contemplates the complete suppression of the traffic in opium prepared for smoking, and draws attention to the somewhat ominous increase of imports of opium into Hong-Kong of from ten to twenty chests a month. The statistics asked for from the different Governments showing the imports, exports, manufacture, distribution, and consumption of the drugs in question appear to have been very incompletely supplied, and an urgent request is made for fuller statistics for the current year. The Commission justly remarks that "if we are to carry through this great programme we must have the co-operation of all countries which are specially concerned in the cultivation, manufacture, and distribution of the drugs." The report concludes with five resolutions, which were submitted to and passed by the Assembly, embodying the views set out in the report; and the United States, which, like Germany, is not yet a member of the League, was invited to send a representative to the Advisory Committee, as has already been done by the latter Power. Thus all too tardily the provisions of the Opium Convention, already ten years old, are being put into operation. John Stuart Mill in his autobiography notes that "all questions on which there are strong private interests on one side and only the public good on the other have long periods of incubation to go through." The control of drugs of addiction would have served him as an apt illustration of his dictum.

RESEARCH DEFENCE SOCIETY.

It is a grave error to underestimate one's enemies, and it would be well if members of the medical profession reminded themselves more often of this military truism in connexion with the hostile forces of the antivivisectionists. The literature of these "campaigners against cruelty" is so ill informed, their arguments are so full of obvious fallacies, and they betray such naïve narrow-mindedness that medical men and women often dismiss the subject with a smile and shrug of the shoulders, reflecting that cranks are as common as *kranken* (from which the word was derived). But the public does not notice how the antivivisectionists misrepresent facts, nor does it perceive how statistics are distorted by such tricks as that of confusing general mortality with case mortality, whilst the appeal to sentiment quickly reaches the tender spot in a race which justly prides itself on its humane treatment of dumb animals. Thus the mischief spreads, the benefits of research are belittled, and scientific investigators are represented as heartless tormentors of defenceless creatures. Every medical man knows that if the public were properly informed as to the way in which experiments are conducted and the magnificent results they have achieved the antivivisectionists would become as harmless and negligible a section of the community as the modern Jacobites. An animal experiment is not a private enterprise of a curiously minded scientist; it is by comparison with other methods of investigation only occasionally resorted to in research, and then only when all other known methods of investigation have failed. As the yearly Home Office Reports show, the vast majority of the experiments performed on animals are carried out for the protection of public health, and we all, just and unjust, reap the benefit of these unadvertised activities. These facts the Research Defence Society makes it its duty to declare to the world. This society was founded in 1908, under the presidency of Lord Cromer, "to make generally known the value and necessity of experiments on animals, the restrictions imposed on them by the Act of 1876, and the great saving of human and animal lives already obtained by means of such experiments." From the headquarters at 11, Chandos Street, Cavendish Square, reports are sent out to members and associates and distributed to public libraries; the magazine, *The Fight against Disease*, may be obtained through any bookseller or newsagent. Members subscribe 10s. and associate members 5s. a year, and the society is very anxious to increase its membership so that the plan of combating antivivisectionist propaganda may be carried out on a larger scale. With these objects all medical men must be in sympathy, for the antivivisectionists of to-day deserve the rebuke that Darwin administered in 1881. "I know," he said, "that physiology cannot possibly progress except by experiments on living animals, and I feel the deepest conviction that he who

retards the progress of physiology commits a crime against mankind." It is hard to understand how the antivivisectionists can regard as villainous and unnecessary such disinterested work as that to which Lister referred when he declared: "I have myself often performed experiments on the lower animals, and if I have been privileged in my professional career to do anything for the good of my fellow men more is to be attributed to these experiments than to any other work in which I have engaged."

THE PHYSIOLOGY OF DIGESTION.

SIR WILLIAM BAYLISS gave an interesting lecture, under the auspices of the Fellowship of Medicine, at the Western General Dispensary on November 6th, when he illustrated by experiment the action of the various digestive juices. He reminded his hearers that the product yielded by the action of saliva alone on carbohydrates was not glucose, but maltose, and that the process of conversion into glucose was completed in the small intestine. At the same time there was evidence that if saliva were allowed to act sufficiently long glucose was eventually produced by its agency alone. The time during which food was ordinarily exposed to the action of saliva was naturally brief, though it might be longer than some had supposed. The enzyme of the saliva could not act in the strongly acid solutions of the stomach, but experiments on rats, with whose food litmus paper had been mixed, showed that food did not immediately become acid in the stomach. After a certain length of time the rats were killed, and on cutting across the stomach it was found that only in the outer portion of the food contents had the litmus become red; in the inner part it remained blue. This suggested that there was an additional time during which the process of converting starch into sugar by the saliva might still be proceeding in the stomach. The action of pepsin in converting the proteins as far as peptones, and the action of trypsin in effecting their further conversion into amino-acids, were demonstrated, and also that pepsin acted only in acid and trypsin only in alkaline solutions. The action of erepsin in separating the small aggregations of amino-acids into their free individual constituents for absorption by the cells was illustrated with the help of the preparation called "ereptone." Sir William Bayliss also referred to the action of other enzymes, including the fat-splitting enzyme in the pancreatic juice, and the enzyme present in the secretion of the walls of the small intestine, which reduced cane sugar finally into glucose and fructose. The chief function of the bile—to dissolve the fatty acids—was also demonstrated by the use of a preparation of bile salts; by adding alkali the difficulty of the precipitation of the salts in a watery solution was overcome.

THE HARRISON MEMORIAL.

A MEMORIAL, erected by subscription in the rooms of the Chemical Society at Burlington House to the late Colonel E. F. Harrison, C.M.G., will be unveiled by Earl Crawford and Balcarres on the afternoon of Thursday next, November 16th. The memorial, which is the work or Mr. Ernest Gillick, is a bronze relief representing a trench scene at the moment when a gas alarm is given. It will be associated with the roll of honour of the Fellows of the Society who fell in the war. The total amount collected makes it possible to present a sum of over £1,000 to the Chemical Society, in trust for the institution of a money prize, to be awarded every three years to the chemist under 30 years of age who, during the preceding five years, has produced research work judged to be of the greatest merit and promise. Colonel Harrison at the time of his death was Controller of Chemical Warfare at the Ministry of Munitions. He had joined the army in May, 1915, and his technical attainments as a chemist were quickly appreciated. Later on his wide knowledge of his science and his fine character led to his appointment to even more responsible offices, and it is an open secret that still further advancement would have been his had he not succumbed in November, 1918, to an attack of influenza at the age of 49. Before entering the army, after a very distinguished early career, he was in independent practice as an analytical chemist. It was while thus engaged that he became associated with the BRITISH MEDICAL JOURNAL and undertook the series of analyses of proprietary articles, afterwards collected and published by the Association in the volumes *Secret Remedies* and *More Secret Remedies*. He gave evidence for the Association before the Select Committee on Patent Medicines, and the scrupulousness with which he prepared his case and the transparent honesty with which it was presented made a deep impression on the Committee.

EVIL EFFECT OF EXCESS OF PROTEIN IN MATERNAL DIET.

THE effect on the offspring of the diet of the nursing mother is very clearly illustrated by some investigations recently made by Miss Gladys Hartwell, D.Sc.[1] She has shown that in rats, when the mother received certain typical diets, definite curves could be obtained for the rate of growth of the litters. For example, when the mother was given a good diet of bread and whole milk the young rats at the end of lactation weighed twice as much as when the mother received a poor diet consisting of bread only. It was observed also that when an excess of protein, such as caseinogen, was added to the standard diet of the mother the litters did not fare so well; they lost weight, some suffered from spasms, and many died. Further investigation showed that this detrimental effect of protein[2] followed the administration of edestin, blood and egg albumen, gelatin, and home-made gluten; such dietaries containing excess protein apparently rendered the milk poisonous and finally checked its flow. The mother suffered no ill effects from the excess protein diets, and Dr. Hartwell found in some cases that there was greater danger to the offspring when the mother gained in weight and flourished on this protein diet. Since the objection might be raised that these results were being obtained on a diet deficient in some accessory factor, Dr. Hartwell has repeated her experiments,[3] taking particular care to supply the nursing mother with butter, yeast extract, and lemon juice, thereby supplying ample amounts of the requisite vitamins. The same remarkable disturbances in the health of the offspring were found when excess of protein was added to physiologically perfect diets for the mother. If such a diet was begun before or during gestation none of the young survived; if started at birth, some survived but they were not normal, and the majority died. Until the eleventh day no defect could be observed, but about that time spasms commenced, the convulsions appearing at approximately the same period irrespective of the length of time the mother had been fed on the excess protein diet. This excess protein diet appeared to be excellent for the young rats when they began to eat for themselves, and a large number of experiments have shown that such a diet is adequate for growth, fertilization, and reproduction in the rat. These toxic symptoms could be prevented by the addition of large quantities of whole milk to the maternal diet, but, although the offspring under such circumstances did not develop convulsions, they did not show such good growth curves as litters raised by mothers not receiving excess protein. Large doses of commercial yeast extract added to the excess protein diet also prevented the onset of spasms. In more recent work shortly to be published Dr. Hartwell has shown that the addition of any substance containing large quantities of vitamin B, notably egg yolk, tomatoes, carrot juice, and potatoes, prevented the toxic symptoms developing in the offspring. It is remarkable that a diet apparently so satisfactory for the mother should yet be so disastrous for the young. The constant character of the spasms and the regularity and punctuality with which they are produced point to the excretion in the milk of some

[1] *Biochemical Journal*, vol. xv, No. 1, 1921.
[2] Ibid., vol. xv, No. 5, 1921.
[3] Ibid., vol. xvi, No. 1, 1922.

highly toxic substance; the fact that the disorder can be prevented by the administration of large quantities of vitamin B proves that an error of metabolism must be the underlying cause. If similar results are observed in other animals, it would seem as though another disease must be added to those known to be due to dietary disturbances.

SIR WILLIAM RAMSAY.

A MEMORIAL to Sir William Ramsay, one of the greatest of British chemists, was unveiled in Westminster Abbey by the Duke of York on November 3rd. The memorial, the work of Mr. Charles L. Hartwell, A.R.A., is a profile bust in bronze set in a marble frame, on the base of which is inscribed "William Ramsay, Chemist." The memorial was offered to the Dean and Chapter by the Duke, who was acting for the Prince of Wales; it was accepted by the Dean, who said that it would be added to the galaxy of memorials to scientists which had been set up in the north aisle. The persons so commemorated included Darwin, Wallace, Lister, Adams, Stokes, Joule, and Hooker. To these, the Dean said, was now added the name of the most famous chemist of our century. Among those present were the French Ambassador, the American Ambassador, the Belgian Ambassador, the German Ambassador, the Japanese Ambassador, the Spanish Ambassador, and the Chilian, Danish, Greek, Lithuanian, Netherlands, Swedish, Chinese, and Norwegian Ministers. Sir Charles Sherrington, President of the Royal Society, Sir T. Gregory Foster, Provost of University College, London, where Sir William Ramsay was professor for many years, attended, as well as representatives of the Universities of London and Sheffield. The French Académie des Sciences was represented by Professor H. L. le Chatelier. The Ramsay Memorial Fund, begun in 1917, consists of nearly £58,000, raised by private subscription all over the world; and the capitalized value of the additional endowments by Dominion and foreign governments is as much again. Eleven Ramsay Fellowships, each of the annual value of at least £300, enable promising research students from Canada, France, Switzerland, Greece, Italy, Norway, Sweden, Denmark, Spain, Holland, and Japan to carry on work in any selected chemical laboratory in Britain. There are also British Ramsay Fellowships, including one specially connected with Glasgow, Ramsay's *alma mater*. From the remainder of the Fund £25,000 is being devoted to a laboratory of chemical engineering at University College, London, where Ramsay taught and worked for twenty-six years; there, also, an annual Ramsay medal has been founded. Ramsay's name will be for ever associated with the discovery of the family of inert gases—argon, neon, helion, krypton, and xenon. Argon was the first of his discoveries, and he was led to it by the late Lord Rayleigh's observations on the discrepancy between the density of atmospheric nitrogen and that prepared from compounds. Helion had been presumed to exist on the strength of stereoscopic examination of the spectrum of the sun's chromosphere in 1868, but it was not until 1896 that terrestrial helion was proved by Ramsay to exist. It was in that year that Becquerel of Paris discovered the radioactivity of uranium; Rutherford later on showed that radioactive emanations were inert gases of the argon type, whereupon Ramsay took up the study of the radium emanations enthusiastically. Ramsay from the first had been attracted to the physical side of chemistry and found a congenial sphere of work in the borderland of physics and chemistry, which by the researches we have mentioned he did so much to map. He was a man of most attractive character, beloved both by his fellow workers and by students. He died on July 23rd, 1916, after a long illness which from the first offered no hope of recovery.

MEMORIAL TO LIEUT.-COLONEL E. M. WILSON.

A MEMORIAL tablet to Lieut.-Colonel Edmond Munkhouse Wilson, C.B., C.M.G., D.S.O., R.A.M.C., who died in the Queen Alexandra Military Hospital, Millbank, rather more than a year ago, was unveiled in the chapel of that hospital on November 3rd. Lieut.-General Sir John Goodwin, D.G. A.M.S., in a brief address, paid a tribute to an old friend and brother officer, who entered the Royal Army Medical Corps as long ago as 1881, and served for twenty-three years with honour and distinction, until ill health compelled him to retire in 1904. Wilson served in six campaigns, chiefly in the Sudan and on the Nile, and came home from the battle of Khartoum in 1899 to take up various important appointments in turn at the War Office and Aldershot. For a number of years he represented the Army Medical Service on the Council of the British Medical Association; he had also been president of the West London Medico-Chirurgical Society, and in various ways he did much to further the interests and the benevolences of his profession. As a man he had a host of friends and not a single enemy. No one could for a moment think any evil of him, for he thought evil of no man. The chaplain-general (Bishop Taylor-Smith) then dedicated the memorial, a marble tablet, bearing the name and titles of the late officer and the words, "He devoted his life to the Corps." There was a large attendance of officers, men, and nurses in the chapel for a brief service. Among those present was Major-General Sir William Macpherson, K.C.M.G., representing the Council of the British Medical Association.

THE ASSOCIATION'S WAR MEMORIAL.

THIS issue of the JOURNAL bears the date of the fourth anniversary of the Armistice, which brought the war that began on August 4th, 1914, to an end. The Council of the British Medical Association has decided that the memorial to members who fell in the war shall take the form of a Book of Honour to be placed in the Library, a memorial tablet in the entrance hall, and a small book for issue to relatives, describing the Book of Honour. It will be seen from the Proceedings of the last meeting of Council, reported in the SUPPLEMENT, that Mr. F. G. Hallett, Secretary to the Conjoint Examining Board in England, has generously undertaken, as a labour of love for the profession, to illuminate and superintend the engrossing of the Book of Honour.

THE Ministry of Health has issued this week the final report of the Departmental Committee on the Causes and Prevention of Blindness. The Committee was appointed two years ago by Dr. Addison "to investigate and report on the causes of blindness, including defective vision sufficient to impair economic efficiency, and to suggest measures which might be taken for the prevention of blindness." The medical members of the Committee were Dr. J. C. Bridge, Dr. A. Eichholz, Mr. N. Bishop Harman, Mr. J. B. Lawford, Sir J. H. Parsons, and Dr. James Taylor, and Mr. C. J. Bond was afterwards made an additional member. We shall publish a full account of the report at an early date.

THE next session of the General Medical Council will commence at 2 p.m. on Tuesday, November 28th, when the President, Sir Donald MacAlister, K.C.B., M.D., will take the chair and give an address. The Council will continue to sit from day to day until the termination of its business.

THE International Society of Surgery will meet in London in July, 1923, under the presidency of Sir William Macewen. The organizing secretaries are Sir D'Arcy Power and Mr. J. E. H. Roberts, F.R.C.S. The society met last in Paris in 1920.

THE eleventh International Physiological Congress will be held in Edinburgh from July 23rd to 27th, 1923, under the presidency of Sir Edward Sharpey Schafer. The treasurer is Professor Arthur R. Cushny, the secretaries are Professor George Barger and Professor Jonathan C. Meakins, and the assistant secretary is Miss Dorothy Charlton, to whom inquiries may be addressed, at the Department of Physiology, the University, Edinburgh. On request she will send particulars of hotels and lodgings.

THE UNIVERSITY OF SHEFFIELD.

THE FIELD LABORATORIES AND PHARMACOLOGICAL DEPARTMENT.

SIR WALTER FLETCHER ON MEDICAL RESEARCH AND DAILY LIFE.

THE new Field Laboratories of the University of Sheffield are now working at full capacity, and on November 2nd were visited by a party of panel practitioners in the neighbourhood.

The Field Laboratories were erected last year at the request of Professor Edward Mellanby on his acceptance of the chair of pharmacology in order that his work on experimental rickets and other dietetic problems, which he had been carrying on in London and at Cambridge, might be transferred to Sheffield. The sum already expended on the erection of the buildings and their equipment is £7,000, and towards this the Panel Committee contributed £1,000, thus affording evidence of the living interest of insurance practitioners in scientific research in medicine.

The buildings of the Field Laboratories have been erected in a field rather more than three acres in area, situated on the edge of the moors at an altitude of nearly 1,000 ft. and about four miles from the university and six from the centre of the city. The buildings consist of a series of army huts suitably modified for their various purposes. One of these (60 by 20 ft.) is used as a residence for the caretaker and assistant. Direct access is provided into a second hut, which is divided into three rooms; one is a chemical and histological laboratory, another is used for *post-mortem* examinations, and the third for weighing and preparing the food for the animals. Between the laboratory and the main building which is used for housing the animals there is a store room in which anthracite, sawdust, and chips are kept. The animal house measures 80 by 30 ft., and is divided into three rooms, which lead into one another; these rooms provide separate accommodation for 65 puppies. A second building, about forty yards from the main group, will be erected for isolation purposes and for treating infective conditions, but owing to the lack of funds this has not yet been completed. At their visit last week the party was afforded the opportunity of seeing the experiments now in progress. The majority of these are designed to throw light on the etiology of several well-known diseases. The extraordinary differences in the growth structure of tissues and general activity of the animals produced by small differences in diet were very clearly to be seen.

In an informal manner Professor Mellanby demonstrated the effect of different diets in the production of rickets. A series of dental specimens, which illustrated the work of Mrs. Mellanby on the influence of diet on dentition, were shown also. Most impressive of all, perhaps, were the remarkable effects on the appearance and activities of puppies fed on different diets.

After the inspection the party returned to the university, where, after tea, they assembled to hear an address from Sir Walter Fletcher, M.D., F.R.S., Secretary of the Medical Research Council. The Vice-Chancellor, in introducing Sir Walter Fletcher, in a few words thanked the practitioners for their help and support.

MEDICAL RESEARCH AND DAILY LIFE.

Sir WALTER FLETCHER said that the Medical Research Council was grateful to the University of Sheffield for the unique arrangements made for the research work conducted by Professor Mellanby and his immediate colleagues, but especially was it grateful for the singular generosity which had inspired members of the medical profession in Sheffield to give important financial support to that part of the work which was being done at the Field Laboratories. The Medical Research Council was making a large annual contribution to the work, but its means were strictly limited and it was a very great encouragement to have voluntary support. It was especially encouraging when support was given directly by members of the medical profession. It was not the case of a benevolent millionaire, though he hoped there might be many such, giving a generous donation towards scientific work as to the nature of which he was imperfectly instructed; but it was the case of men who really knew the meaning of the work giving it support.

Grateful as the Council was for that financial co-operation, it was the interest that generosity evidenced which was specially welcomed. Those interested in the advance of knowledge by scientific research work in the field of medicine needed the help of medical men, at every turn, wherever it was a question of making available for the benefit of the public the practical fruits of research work. There were many directions of inquiry in which the laboratory man was helpless unless the man of practical experience of human needs was closely co-operating with him. That co-operation might almost be taken for granted, but the research worker needed also the help of the profession as interpreters to the public. The laboratory man was buried in the laboratory, and little seen by the public. But the doctor went everywhere, and had the necessary knowledge to guide and enforce public opinion—hitherto backward in this country—which was to support research; public interest and knowledge must be moulded and stimulated by medical men.

"I was reading last week," the speaker continued, "that delightful essay by John Brown of Edinburgh upon Sydenham. Writing in the last generation, long before this most recent busy output of pathological and physiological work, he looked into the future and said that the progress of scientific knowledge affecting medicine was going to increase in a manner which would defy all calculation, and he said that it would have the most important effect upon the quality of the medical profession. He prophesied that the office of physician would in a high sense become more difficult than before, because it would require a greater compass and energy of mind—it would be working in a wider field and with finer weapons. Surely that prophecy has been fulfilled, and the medical man of to-day is working with an incomparably greater compass and incomparably finer weapons than his predecessors of only a generation ago."

Sir Walter Fletcher went on to speak on the general topic of his address—the obvious and visible importance of medical research work in the daily life of the community. The ordinary layman, who put himself unquestioningly in the hands of the physician or surgeon, and accepted all the resources brought to bear to help him, was necessarily little aware of the laborious researches upon which those resources, from large measures of treatment down to tiny points of technique, were based. Research workers had difficulty in bringing home to the public how the work they did bore fruit in practical life outside the technical field of the operating theatre or the medical ward. Research work did not get, or until recently had not got, the same public support and encouragement—and gratitude—from Englishmen as it had received, and was receiving, in countries like Germany and America. The Englishman was in some ways paradoxical. He was characteristically kind-hearted; he hated pain, and if pain were presented to him he desired to help it. British charities for the diminution of suffering were earlier, and had been more generously supported, in this country than in any other, and our nursing services have been earlier and better than those of any other country. But the Englishman was not so imaginative as the instructed public of those other nations. If the pain was stopped, or at least if it were out of his sight, he forgot it, and he did not think so deeply of the importance of preventing it for the future. The sums of money given in this country for the removal of immediate pain and immediate disease and suffering were enormous when compared with the trifling amounts offered either by gift or bequest for the scientific research work by which alone secure advances could be made towards the permanent prevention or further palliation of suffering. There were two ways in which the research worker and his work were apt to be undervalued and underestimated. All work which aimed at preventing pain and disease suffered under a conspicuous handicap. The more successful it was, the less obvious the results. If a disease were practically abolished, as for example small-pox in this country, the boon was easily forgotten. "I am just old enough," the speaker said, "to remember what a pock-marked face is like. I should say that very few of the undergraduates in this room know really what I mean when I speak of a pock-marked face. They have probably no vivid visual recollection of that, and yet their grandfathers could remember a time when a girl's chances of marrying were enormously increased if she were not pock-marked." A more recent example was the inestimable triumph of the virtual abolition of enteric fever and its congeners during the late war. It had often been spoken about, but it was already being rapidly forgotten.

In the South African war very many more men died from the bacillus than from the bullet. But in the late war, owing to research work diligently pursued in the interval in the Army Medical Service, the position was exactly reversed, and, for the first time in recorded history, there were more deaths from the bullet or the shell than from disease. Enteric fever was practically negligible in our army, in spite of the incredibly insanitary conditions of most of the fighting area. Had the lesson really sunk home in the minds of the people of this country?

"I noticed quite lately," Sir Walter Fletcher continued, "two war memorials in the same village—one for the South African war, and one close by for the late war, the great war. I noticed with interest that upon the South African memorial there are a few names, a handful of names, of those who were killed by bullet or shell, and then a long list of those who 'died from illness'—which meant enteric fever. Close by was the memorial to those who fell in the great war, unhappily with a much greater roll of names, but not one of those had died from enteric disease. Imagine what it would be if by some magic you could see inscribed, in any given village, the roll of the names of those who would have died but for that research work. The roll of names would be much longer than the mournful roll of those who actually fell, and it would keep alive our debt of gratitude to the men who produced that result. Yet it was only in the last session that more than a hundred members of Parliament voted in the House of Commons in favour of a resolution that no further public money should be spent upon medical research work. More than a hundred members of Parliament voted in favour of Kenworthy's bill, which would preclude for all future time—until it was rescinded, as future generations would rescind it—any similar research work on behalf of the Army, or the Navy, or for any other Government department, or in the universities of the country, supported by public funds."

There was another kind of difficulty. When the fruits of research had been gathered in—and this was especially true of results of research work like much of that done at the Field Laboratories, which touched the practical daily life of mankind—there was a persistent tendency on the part of what was called the practical man to say "Yes, but of course we knew that before; common sense would have told us that." An old saying, which contained a great deal of truth, was that in this country any scientific discovery was submitted in successive stages to three kinds of criticism. In the first stage men said frankly that they did not believe it, that it was untrue; in the second stage that it was contrary to the doctrines of the Christian religion; and in the third that they knew it before. The "knew it before" attitude was very common, especially in the field of medical research.

Of this the speaker gave two definite instances: "When I went from Cambridge to London to begin my present work in 1914, shortly before the war, I met the Minister of the department which is in duty bound to take chief interest in the results of medical research work, and he was good enough to have a long talk with me on the terrace of the House of Commons. And I remember he cheerfully and frankly said to me, 'Well, doctor' (I have never pretended, then or since, to be a doctor)—'well, doctor, I don't hold with research. If we want to stop disease we must give the people better grub and less dirt.' Now that was the considered opinion of a responsible Minister. There is, of course, much truth in what he said, that given 'better grub' and given 'less dirt' disease would be incalculably lessened in this country; and my reply of course was that I entirely agreed—if he could tell me what better grub was and what less dirt was, for I know no way of finding out those two things except by persistent scientific research work."

"As we look back now we can see how clear a guide has already been given us in many directions towards knowing what 'better grub' means, by scientific work only made possible by public expenditure." Of this illustrations were at hand in some of the work in the Sheffield laboratories. The nation ought to be very proud of the studies of vitamins going on so actively, not only in Sheffield but in other centres of research work: proud because the fundamental discovery underlying it all was made in this country. The whole subject, so to speak, had been the almost exclusive property of the English-speaking races. The Americans had actively pursued it, but the Germans, the Austrians, the French—so active in other directions of research work, especially before the war—were still far behind us in this vitally important subject.

The fruitful and practical applications of the work were immediate and obvious. Further knowledge must simplify the process of getting knowledge, but at present such investigations were expensive, because they had to be done slowly, by the use of animals. But they told us about "better grub" for the people. Already, although we were still ignorant, only at the dawn of the subject, although even Professor Mellanby had, the speaker felt confident, no clear idea in his mind when he used the word "vitamins" in regard to their chemical nature or the mode of their action—already there was abundant practical fruit, a circumstance quite unusual in the history of the growth of science: the British housewife could now be advised, and should now be advised by the proper authorities, of the differences to the present and future lives of her children that depended upon whether she gave them butter or margarine; the differences between one kind of butter and another kind of butter; the time for which she boiled the cabbage (that was a matter of very great importance, or might be, to the lives of her children); and whether she should use lard or other forms of fat; other illustrations would be familiar to medical men. It was being said that all that was "known before." It was obvious, some people said, that milk would be better if it came from a cow eating green grass than if it was eating hay in the winter, and so on. Well, if all this was known before those who knew it and concealed the secret were homicidal criminals. Those who had seen some of the experimental work at the Sheffield Field Laboratories would know the tremendous power of control over the bodily shape and bodily health of the animal which relatively minute differences of diet would bring about. And the study was yet in its infancy; much more work was urgently needed, yet it was possible now to look forward confidently to a time when immeasurable benefit could be brought to the populations of our great cities through this work. Yet more than a hundred members of the last Parliament voted against its continuance.

There must have been very few during the war who did not notice, with a good deal of heart sinking, the passage of the Australians and New Zealanders about our streets, with their splendid figures and faces, who did not reflect sadly that these men were of the same bone and blood as ourselves, and yet seemed to be members of a superior race as compared with the ordinary Londoner; if they had come in the same numbers to Sheffield the contrast might have been even more marked. There was a time coming, to which scientific research work was fairly pointing the way, when it would be regarded as a shameful anomaly if the average Englishman was not at least as finely developed in body and face as those men were. "I hope," Sir Walter Fletcher said, "I may live to see the day when beauty again of that type comes back to the faces of the populations of our great cities."

He could not stay to touch upon the interesting new work about the action of light, and the remarkable way in which sunlight or artificial light, falling upon the skin, seemed able to do part of the work done ordinarily by vitamin substances in food. There again the common-sense man said, "Only a fool could ever doubt that sunshine is good for man. We knew it before." That was true, but in our northern island vast numbers of our fellow countrymen lived in smoky cities, and the knowledge of how to supply by appropriate artificial means proper artificial light, and if necessary food—the equivalent of the rich man's holiday time on the Riviera—would work untold benefits to this country. From a purely scientific point of view there was hardly any more interesting chapter in biology than that now opening, which seemed to point to cod-liver oil as being, in some literal truth, bottled sunlight; we might have to depend upon artificial light and artificial conditions of food until the results of the industrial revolution were palliated and we had built Jerusalem again in "England's green and happy land."

"So much," Sir Walter Fletcher said, "for grub. I had meant to say something about dirt, the lessened dirt that my friend thought would do so much for the diminution of disease. But what is dirt? Let us think of the soldiers in the trenches. It was wholly impracticable to say, 'Let them be clean.' It is impracticable to tell a coal miner to be clean. Almost all our industrial population are in a sense waging a kind of warfare where personal cleanliness of the ordinary kind is impossible during the hours of labour. But it was not dirt in the ordinary sense of the word that injured the soldiers. It was not the mud of the trenches. That brought them nothing beyond inconvenience. It did not bring them death unless it was dirt of a particular kind, and only the scientific

man was able to say what were the dangerous kinds of dirt, and how they could be avoided—how scabies could be prevented, which was one of the greatest sources of loss of man power during the war; how tetanus, coming from the soil, could be prevented; how typhus and trench fever could be kept at bay by tracing out the exact mode by which those diseases are conveyed from man to man by lice, where not mere cleanliness is sufficient, but measures which are effective to destroy particular insects. And in the mines of Cornwall it is not dirt which injured the men's health, but over a large district it was hookworm disease, where the particular stage of the parasite entered through the skin, and so spread the infection; and a knowledge of the precise mode of propagation was sufficient to stamp out the disease. Many are the instances of that kind that will occur to everyone here.

"So many of our opponents—because we have opponents, as well as those who are merely passive—the opponents of medical research work are fond of saying that this or that triumph of medical science is the result of improved sanitation. That can be definitely disproved in many instances. But even our drainage, the enforcement and development of our drainage schemes, has throughout been stimulated and guided by a growing precision in our knowledge of the organisms of disease. Even now research is actively in progress, and is still needed. Research is needed into the new process, the activated sludge method, recently installed in Sheffield. It appears to be completely successful, but it is not perfectly understood, and we may be certain that until it is perfectly understood it can never be constantly successful, and there will always be times when something may go wrong without an available remedy.

"I am sometimes tempted to think that the stimulus of research work has driven sanitation too far. Our knowledge as it has grown has, I think, shown that a great deal of the modern plumbing which is insisted upon by various by-laws is really unnecessary, and dates from a time when a mysterious agent called effluvium was supposed to convey disease. I firmly believe that the cost of housing might be cut down in an important way if science were allowed full play, as it is in some parts of America, in the devices which are now used.

"I should not like to leave the subject, especially when speaking in a university, without trying to remove any impression I may have given that I or any other scientific man, or any of the research workers of the country, are thinking all the time of the material benefits they can produce. They have produced those material benefits, and all mankind owes them gratitude, but it is not for these mere additions to our comfort that these men are working, and it is not merely for the practical fruits that, in my opinion, the public support and public money should be given. It is quite unnecessary, in a place of this kind, to point to the value of knowledge for its own sake. In the instances I have briefly touched upon, where I have appeared perhaps chiefly to think of the practical boons conferred, the interest and beauty of the scientific work involved is very great indeed. This kind of work in any civilized nation is needed not only for utility, though Heaven knows that is justification enough, but for its interest and its delight, for our self-respect and for the dignity of man, and, I would add, for our worship. After all, the second great commandment about loving our neighbour cannot be more than an empty sentiment nowadays unless the love takes a practical form, and unless it is free, so far as possible, from ignorance. This scientific work is necessary for the fulfilment of that commandment. It is necessary, too, for the fulfilment of the other great commandment. That consideration has, I think, never been better expressed than by a physician, Sir Thomas Browne. You remember he said: 'The wisdom of God receives small honour from those vulgar heads that rudely stare about and with a gross rusticity admire His works. Those highly magnify Him who by deliberate research into His creatures and judicious inquiry into His acts return the duty of a devout and learned admiration.'"

Sir Walter was heartily thanked for his address on the proposition of Dr. Arthur Hall, seconded by Dr. Forbes, secretary of the Sheffield Panel Committee. In reply, he said: I know that my Council have it in view to ask Sheffield, if I may use so comprehensive a word, to undertake another very important piece of work, and I hope I may take back a favourable answer with regard to that when I return.

SMALL-POX IN LONDON.

THE total number of cases of small-pox reported in and near London during the year 1922 down to November 4th is 62, with 17 deaths; that is greater than in any year since 1904. Reference to the following table shows that this figure is possibly comparable with the 63 of 1891 and with the 66 of 1900. Each of these figures was followed by a heavy outbreak in the following year; the outbreak which appears now to be impending may be further postponed, as it has already been postponed, both by the improvement in public education on the subject of small-pox and by the heightened efficiency of the public health service; but there is no doubt whatever that the present external pressure of small-pox on the one hand, and on the other the negative internal susceptibility to the disease, brought about by the neglect of vaccination, have reached such a point that an adjustment is extremely likely to take place by means of a smart if not a heavy epidemic.

Year.	Deaths from Small-pox		Admissions to M.A.B. Hospitals.		Year.	Deaths from Small-pox.		Admissions to M.A.B. Hospitals.
	England and Wales.	London				England and Wales.	London	
1881	3,098	2,367	8,551		1901	356	229	1,743
1882	1,317	430	1,799		1902	2,464	1,314	7,842
1883	957	136	598		1903	760	13	355
1884	2,234	1,236	6,363	Cases certified in England and Wales.	1904	507	25	449
1885	2,827	1,317	6,146		1905	116	10	53
1886	275	20	99		1906	21	0	27
1887	506	9	56		1907	10	0	2
1888	1,026	9	62		1908	12	0	1
1889	23	1	5		1909	21	2	15
1890	16	3	22		1910	19	0	5
				293	1911	23	9	70
1891	49	8	63	124	1912	9	1	5
1892	431	29	325	116	1913	10	0	1
1893	1,457	186	2,376	66	1914	4	0	1
1894	810	89	1,117	92	1915	13	3	11
1895	223	55	941	151	1916	18	0	1
1896	541	9	190	7	1917	3	0	0
1897	25	16	70	64	1918	2	0	36
1898	253	1	5	297	1919	25	5	27
1899	174	3	18	263	1920	29	4	18
1900	85	4	66	336	1921	5	0	2

The present run of cases began with the disclosure at a consultation on October 27th, 1922, at St. Andrew's Hospital, Bromley-by-Bow, formerly the Poplar and Stepney Sick Asylum, of a case of small-pox in the person of an inmate who had been admitted from the Poplar institution, formerly the Poplar workhouse, on October 24th, 1922. On October 27th a rash appeared on his skin, and he was removed that evening to the small-pox receiving station of the Metropolitan Asylums Board. Vaccine lymph was sent for by special messenger, and vaccination of the immediate contacts was begun the same evening. Revaccination of all of the staff of the hospital has been brought up to date, and nearly all of the inmates have now been revaccinated. The risk of a spread in this institution is minimized owing to this case having been detected on the same day that he became infectious, and to the prompt measures which have been taken.

On the morning following this occurrence—namely, on Saturday, October 28th—consultations were held on certain cases in the Poplar institution, and as a result there were at once certified five cases of small-pox from two of the men's wards. There was thus suddenly disclosed a most serious situation, inasmuch as there was then reason to suspect that further cases of small-pox were scattered throughout the institution. This, in fact, proved to be the case. Apprehension also arose that infection might have been conveyed outside owing to the free ingress and egress of the inmates and staff.

A rapid plan of operations to meet the emergency was at once drawn up, embracing the following main indications: (1) to search for every further existing case; (2) to remove or destroy the infection thus disclosed, by prompt transfer of the patients and immediate disinfection; (3) to protect the contacts as far as possible by vaccination, and to watch for further cases arising; (4) to ascertain the origin of the outbreak.

Various remedial steps, falling under one or other of these main heads, were taken almost simultaneously. All ingress to and egress from the institution was at once stopped. Immediate notice was given to the Poplar Borough Council, the London County Council, and the Ministry of Health.

Vaccine lymph was sent for; removal of the small-pox cases hitherto discovered, and disinfection of infected articles and places was immediately undertaken; and an individual examination of all the persons resident in or nearly connected with the institution was begun. Acting under medical advice these various steps were ordered or sanctioned by the House Committee, whose Chairman was at once on the spot; and as a result of this and of other conferences which took place as occasion required a situation of much gravity was thoroughly well in hand within thirty-six hours from the discovery of the first cases; apprehension for the future occurrence of small-pox within the institution, except for the considerable number of cases already infected, was at an end.

The individual inspection of all persons in the building was a task of some magnitude. The most exposed groups of persons were taken first. At the discovery of the first group of small-pox patients an immediate note had been made of the age, name, original ward or dormitory, date of transfer and to which ward, date of onset of acute illness, date of rash. Many of the inmates were aged and infirm, it being the practice to transfer cases of serious illness from the institution. As soon as the above particulars were had, it was obvious that certain other wards were likely to contain further small-pox patients; and also, from a comparison of the dates of onset and rash of these five cases, it was apparent that they were infected by a common source which certainly had been acting on or about October 13th to the 15th; accordingly inquiry was at once made for a person who had fallen ill about that date and possibly escaped recognition. This person was speedily found; he had fallen ill on October 13th and had had what now proved to be the rash of small-pox on October 15th and had infected some of the above cases, and others which followed. Whence he contracted his disease is not known. He must have been infected on or about October 1st. He was engaged in laundry work, in which occupation he had the opportunity of handling the clothing of recent admissions. It was also noteworthy that some of the cases which eventually came to light were probably infected about October 10th; the whole origin of the outbreak, therefore, is still undetermined.

As a result of these personal inspections there were discovered and sent away for isolation four further cases on October 28th. That evening a plan was drawn up for the medical inspection next morning of every individual in the building by the medical personnel, who were provided with sleeping accommodation in the building by courtesy of the House Committee. Eight more cases were discovered on Sunday, October 29th. Careful medical inspection was maintained from day to day, as a result of which on October 30th 2 more cases came to light, on October 31st 5 cases, on November 1st 3 cases, on November 2nd 3 cases, on November 3rd one, and on November 4th one, making 32 cases in all arising within the institution.

In the original plan of operations the following classes of contacts were drawn up:

1. Other inmates.
2. Inmates discharged from the institution between October 10th and 28th. This list was added later.
3. Medical and nursing staff in attendance.
4. Scrubbers and other attendants.
5. Male porters.
6. Occasional visitors to the wards, such as guardians and chaplains.
7. Various classes of staff, such as engineers, laundry staff, and others.

These had to be listed and the sleeping places ascertained. In this manner four other cases were detected outside—namely, a medical officer who had been acting as locumtenent, a fireman, a laundry hand, and a scrubber. Instant steps were taken to control the infection likely to spread from these individuals, the contacts at once being vaccinated.

Vaccination of the staff of the institution and of the inmates was begun the same evening (Saturday, October 28th) and was pushed with such energy that by the evening of Sunday, October 29th, about 900 vaccinations had been performed. The staff and inmates of the institution numbered about 950, and the remaining 50 were vaccinated on the morning of October 30th; four vaccinators were at work. Subsequently some stragglers were discovered and immediately vaccinated.

The cases of small-pox observed fell roughly into four classes. Many of the inmates had mild attacks, their wrinkled and inelastic skin showing papules, vesicles, and pustules which were insignificant and ill developed. Some such individuals, however, developed attacks of the greatest intensity. Several initial rashes of the severe petechial type were noted, and two patients developed haemorrhagic small-pox in its worst form, their skin assuming a universal dull crimson tint from head to foot, accompanied by marked effusion of the conjunctivae. One of these patients, as is not uncommon in such attacks, stated, in reply to questions, that "he felt beautiful." He died the next day.

Among the staff and others in ordinary health, cases of all grades were well developed, from the mild discrete cases ushered in with a severe "cold," followed by a few insignificant spots, to others marked by initial symptoms of great intensity followed by a confluent rash. The total number of cases in or connected with the Poplar institution up to the end of last week has been 38, with 11 deaths.

At the present time, owing to the thorough steps which have been taken, the Poplar institution is almost free from risk of small-pox to its inmates. Inmates discharged, however, between October 10th and 28th constitute a risk to those outside and to other institutions to which they may be admitted. One such case admitted to another institution was speedily detected.

The alertness and decision with which the Institution Authority acted in this emergency deserves high praise, and may well form an example to others similarly placed.

CONFERENCE OF CREMATION AUTHORITIES.

A CONFERENCE of cremation authorities, convened by the Cremation Society of England, was held on October 26th at the Guildhall, London. The main purpose of the meeting was to discuss the causes that deter people from adopting cremation as a substitute for earth burial; the methods by which information about the advantages of cremation might be spread and its practice facilitated and cheapened; and the appropriate fee for medical practitioners or medical officers of health certifying deaths on form C, under the Home Office regulations. The chair was taken by Sir MALCOLM MORRIS, F.R.C.S., and there were present, in addition to representatives of various London and provincial crematoria, Sir William Willcox, M.D., Dr. Louis Parkes, Dr. Chalmers Mitchell, F.R.S., and Mr. H. T. Herring, Medical Referee of the London Cremation Company.

The CHAIRMAN at the opening of the proceedings explained that this was intended to be a round-table conference for the exchange of views rather than for the passing of formal resolutions. Almost every speaker touched on the very slow progress which cremation had so far made, and attributed this largely to uninformed sentiment, but in part also to apathy and indecision among those who approved of cremation. It was agreed that the education of the public in what cremation meant, and how it was carried out, must be pressed forward. Representatives of cremation authorities in several large cities spoke of the lack of public interest with which they had to contend, and of the difficulty experienced in making known the advantages of cremation. A Liverpool alderman ascribed the slow progress rather to indifference than to active opposition; although his authority had done everything possible to overcome hindrances due to the formalities imposed by the Home Office the number of cremations in Liverpool was still very small. Dr. CHALMERS MITCHELL in the course of his remarks expressed the view that in an appeal to public feeling it was most important to recognize the psychology of the public addressed. Popular propaganda in this matter should, he thought, be more dialectic.

Cremation and Death Certification.

Sir WILLIAM WILLCOX emphasized the sanitary argument in favour of cremation, and discussed briefly the safeguards now imposed upon the practice of cremation in order to prevent the possibility of concealment of crime. He recorded his belief that the popularizing of cremation was intimately bound up in a much bigger subject—namely, reform of death certification. The present system of death certification, he said, urgently needed revision; much more care and detail ought to be required for ordinary certification; under a perfect system concealment of crime would be impossible. Mr. HERRING also dwelt on the importance of pressing for reform of the present lax system of death certification. In view of public indifference to hygiene, he thought that propaganda should dwell rather on the aesthetic than on the sanitary aspect of cremation. He added some practical suggestions for dealing with the question of the fee for medical certificates for cremation. Dr. PARKES expressed the view that cremation would not get much farther forward until the medico-legal questions, especially that affecting concealment of crime, had been settled. He agreed that the position of death certification in this country was most

unsatisfactory, and declared that successive Governments had neglected their duty by failing to bring about reform. Provided the medico-legal difficulties were overcome, he could see no reason why arrangements for cremation should not be undertaken as a public measure by municipal authorities.

An informative discussion came to a close with a decision that the conference should be kept in existence to meet again on future occasions.

THE GENERAL ELECTION.

Of the fifty-seven members returned to the House of Commons on Saturday in the absence of any opposition two are members of the medical profession. Sir William Whitla, who again represents Queen's University, Belfast, was President of the British Medical Association in 1909, and has not ceased to give the Association his support both in and out of Parliament. Sir George Berry is returned as one of the members for the Combined Scottish Universities, in succession to Sir Watson Cheyne, who did not seek re-election. Sir George Berry is consulting ophthalmic surgeon to the Edinburgh Royal Infirmary, and has been President of the Royal College of Surgeons of Edinburgh. Sir Henry Craik, also returned as one of the members for the Combined Scottish Universities, represented the Universities of Glasgow and Aberdeen from 1906 to 1918, when the combined constituency was formed and he was elected one of the representatives. He was for many years associated with the Education Department, and from 1885 to 1904 was Secretary of the Scottish Education Department. His constituency probably contains a larger number of medical men than any other. He has exhibited a keen appreciation of the aspirations and needs of the medical profession, has shown his willingness to consult the British Medical Association, and has on many occasions cogently placed the views urged by the Association on behalf of the profession before the House of Commons.

English and Welsh University Constituencies.

At Oxford the representatives in the late Parliament, Lord Hugh Cecil and Sir Charles Oman, both described as Unionists, have to defend their seats against Professor Gilbert Murray, Regius Professor of Greek, described as a Liberal. At Cambridge, Mr. J. R. Butler (Independent), secretary of the Board of Historical Studies, is standing against two Conservatives, Mr. J. F. P. Rawlinson, K.C., and Dr. W. R. Sorley, Professor of Moral Philosophy. For the single seat of the University of Wales there is a triangular contest between Sir E. J. Ellis Griffith, K.C. (Liberal), Mr. T. A. Lewis (National Liberal), and Dr. Olive Wheeler (Labour), who is not, we believe, a member of the medical profession. These contests, therefore, have no direct interest for the medical profession. It is otherwise with those for the representation of the University of London and for the Combined English Universities.

University of London.

For the single seat of the University of London there are three candidates—Sir Sydney Russell-Wells, M.D. (Unionist), Professor A. F. Pollard (Liberal), and Mr. H. G. Wells (Labour). Sir Sydney Russell-Wells, M.D., whose candidature is approved by the British Medical Association, is standing as a Conservative. He was for twelve years Chairman of the University Council for External Students and was elected vice-chancellor in 1919, a position he resigned recently. He is physician and pathologist to the National Hospital for Diseases of the Heart. He looks upon the position of University members as exceptional, since they are not so closely bound by party ties as other members. He is opposed to any attempt to erect two universities in London; and desires that the University should retain its full autonomy and freedom from Governmental control or departmental interference. The Government should help with funds by way of block grants, and not for specific purposes, grants in the latter form being less useful and more extravagant. With regard to health matters he says:

"The health of its people is rightly the concern of any Government. Much has been done, but much more can, I believe, be done without increased expenditure. The present system of overlapping and competing local authorities is both wasteful and confusing. The existing medical benefits under the National Health Insurance Acts should be continued, and should as now be controlled by publicly elected bodies, though the present Insurance Committees are capable of improvement; but the benefits are incomplete and require supplementing by consultant, specialist, and expert pathological assistance, and in many instances hospital treatment. The establishment of a whole-time and State salaried medical service would, however, in my opinion be a disastrous step, for it would in the long run be very costly; it would minimize the personal and friendly relationship between doctor and patient, and would encourage constant official interference and standardized methods which, in an imperfect and constantly progressing science like medicine, would have a sterilizing effect. War conditions have increased the number of woman medical practitioners, and in all medical appointments no discrimination should be made in emoluments on the ground of sex. Improving the education and widening the knowledge of the medical profession are probably the greatest aids to the health of the community, and increased grants to universities for teaching and research are therefore in this respect, as in many others, a sound investment and true economy."

Professor A. F. Pollard, who is standing as a Liberal, is Professor of English History and Chairman of the Institute of Historical Research in the University of London; previously he was Professor of Constitutional History at University College. He also observes that a university franchise is a privilege grounded upon a special qualification of intellectual attainment and has to find its justification in its results. In dealing with the question of economy, he says:

"There is no source of wealth comparable to the health and brains of a people, and expenditure on those first conditions of national welfare is the soundest kind of saving. There is no economy in disease, and ignorance is the prolific parent of waste." He recognizes that "with a national debt ten times as great as that before the war we have not the means that we had to spend on social reforms, and waging war on private enterprise will not conduce to thrift." Every kind of expenditure is not waste. "Prevention of disease, the building of houses that are needed for living and not for luxury, the improvement of transport, the education of the people are necessary economies, and the fact that we are poor is all the more reason why we should make a remunerative investment of what we have."

Mr. H. G. Wells is a candidate on behalf of the Labour party. He is best known as a novelist, but is a Bachelor of Science, was for some time a secondary teacher, taking the diplomas of Licentiate and Fellow of the College of Preceptors, and has written popular educational books.

In his address he says that he would "battle against the violence of wild men with 'axes' chopping insanely at the endowment of knowledge and the health and education of our people." "I am opposed to all this 'axe' mischief in the sphere of public health, education, and research. . . . Let us get on with scientific research and teaching, with education, with production, the development of international controls and world disarmament."

Combined English Universities.

In the Combined English Universities there are six candidates for two seats. The late members, Mr. H. A. L. Fisher (N.L.), until recently Minister of Education, and Sir Martin Conway (U.) are standing again. They are opposed by two other Unionists, Mr. W. B. Faraday, LL.B.Manchester, and Dr. Sydney C. Lawrence, who graduated M.B., Ch.B. Birmingham in 1903; their appeal to the electors is based partly on the fact that each is a graduate of one of the constituent colleges and that it is desirable that the University should be so represented. An independent candidate has come forward in the person of Mr. John Strong, Professor of Education in the University of Leeds; he anticipates a large measure of support from teachers who are graduates of one or other of the universities. The sixth candidate is Mr. L. S. Woolf, who is standing in the interests of the Labour party.

Counties and Boroughs.

To the list published last week of twenty-eight medical candidates for the representation of counties or boroughs we have to add three names. Dr. Leonard Molloy, who is a candidate for Blackpool in the Conservative interest, is consulting physician to the Victoria Hospital, Blackpool, served as a combatant in the Duke of Lancaster's Own Yeomanry during the war, and received the distinction of D.S.O. for his services. He is opposed by a Liberal. Dr. C. Harvey Dixon of Oakham is standing as a Conservative for the Rutland and Stamford Division of Lincolnshire, where he is opposed by two candidates, one described as belonging to the Liberal party and the other as an agriculturist. Dr. R. Dunstan is standing in the Labour interest for the Ladywood Division of Birmingham against Mr. Neville Chamberlain. Dr. H. B. Brackenbury, who stands as an Independent Liberal for East Walthamstow, is well known to the members of the British Medical Association, for he is Chairman of the Insurance Acts Committee and has been deputy chairman of the Representative Body since 1921. His candidature has the official approval of the British Medical Association. He has to meet a Conservative, who was until

the dissolution the sitting member, and a Labour candidate. Dr. D. F. Todd, who is a member of the Association and at one time active on its Council and committees, is opposing the late member, Mr. J. J. Lawson (Labour), in the Chester-le-Street Division of the County of Durham. The profession will wish him success.

England and Wales.

Library of the Bristol Medico-Chirurgical Society.

We mentioned three weeks ago (October 21st, p. 767) that the Bristol Medical School had been completely incorporated with the University of Bristol. We are now able to announce that the Bristol Medico-Chirurgical Society has presented its library to the University, and that the gift has been gratefully accepted by the Council of the University. The collection comprises over 15,000 volumes, and has been valued at over £12,000. It contains some rare books, and over 100 current periodicals are received in exchange for the *Bristol Medico-Chirurgical Journal*, which is published by the society.

Radiology and Electrotherapy: The Manchester Meeting.

As briefly announced in last week's issue, a joint meeting of the Röntgen Society and the Electrotherapeutics Section of the Royal Society of Medicine will be held at Manchester, in the Physics Department of the University, on Friday and Saturday, November 17th and 18th. On the Friday afternoon short papers and demonstrations will be given by Professor W. L. Bragg on "The structure of metals as analysed by x rays," and by Professor A. V. Hill on "The psycho-galvanic reflex" and "The hot wire sphygmograph." At 5.15 p.m. Professor Jacobaeus, of Stockholm, will lecture in the clinical theatre of the Manchester Royal Infirmary on "Cauterization of pleural adhesions under fluoroscopic control"; concurrently, Mr. J. R. Clarke will lecture on "Measurement of high voltages," Mr. E. G. McKinnon on "Storage batteries," and Mr. V. E. A. Pullin on "Examination of metals." In the evening there will be a dinner, at which Professor Jacobaeus will be the guest of the evening, supported by Sir Humphry D. Rolleston, P.R.C.P., President of the Röntgen Society, and Dr. Robert Knox, President of the Electrotherapeutics Section of the Royal Society of Medicine. On the Saturday morning arrangements have been made for visits to the works of the Ford Motor Company and the Metropolitan Vickers Electrical Company, in Trafford Park, and other important industrial undertakings, and to the Radium Institute, and the *X*-ray Department of the Skin Hospital. In the afternoon, at 2.30 p.m., the new *X*-ray and Electrical Department of Manchester Royal Infirmary will be opened by Sir Humphry Rolleston, and thereafter the new department will be open for inspection. The meeting is open to non-members, and any medical practitioner who wishes to attend any of the meetings or the dinner will be welcomed; further information regarding arrangements may be obtained from Dr. A. E. Barclay, the Royal Infirmary, Manchester.

Middlesex Hospital War Memorial.

The war memorial at the Middlesex Hospital Medical School in memory of those students who lost their lives in the great war has, after careful thought, taken the following form. In the hospital chapel four stained-glass windows have been erected, and the architect of the chapel, Mr. Frank L. Pearson, has made an appropriate choice of subjects by selecting for these windows four soldier martyrs—St. George, St. Alban, St. Martin of Tours, and Joan of Arc. The main part of the memorial to the fallen students is in the medical school. Memorial tablets have been placed in the old entrance hall, and the common room has been panelled in oak and a portrait of Captain John Fox-Russell, V.C., M.C., painted by Mr. Ronald Gray, has been placed in the central panel. The dedication and unveiling ceremony took place on Wednesday, November 1st, All Saints' Day. The Bishop of London conducted the service in the Chapel, which was attended by the Earl of Athlone, many members of the Board of Governors, the chairman of the medical school, Mr. S. G. Asher, the dean of the medical school, Mr. A. E. Webb-Johnson, the chairman of the memorial committee, Mr. Comyns Berkeley, members of the staff of the hospital and school, relatives of the fallen, Surgeon Vice-Admiral Sir Robert Hill, K.C.B. (Medical Director-General, R.N.), Lieut.-General Sir John Goodwin, K.C.B. (Director-General, A.M.S.), and a large number of past and present students. After the ceremony in the chapel and the dedication of the windows by the Bishop of London those present proceeded to the medical school, where Sir Robert Hill, on behalf of past and present students, invited Sir John Goodwin to unveil the memorial tablets. He remarked on the large number of the fallen who had served in the R.A.M.C., and the conspicuous service the Directors General of the Army Medical Service had rendered by the way they had mobilized the medical profession for war service. Sir John Goodwin made a sympathetic reference to the services rendered by the students of the Middlesex Hospital. Of the forty-six who had fallen and whose names were inscribed on the memorial tablets, eighteen had served in the Officers' Training Corps previous to the war and by the sacrifice of their leisure had been available as trained officers when war broke out. He remarked on the fact that of the forty-six killed fifteen were holding permanent commissions in the R.A.M.C. Conspicuous among these, though only an example of the gallantry shown by all, was John Fox-Russell, who lost his life in the campaign in Palestine, and was awarded the Victoria Cross—

> "For most conspicuous bravery displayed in action until he was killed. Captain Fox-Russell repeatedly went out to attend the wounded under murderous fire from snipers and machine guns, and in many cases where no other means were at hand carried them in himself although almost exhausted. He showed the highest possible degree of bravery and valour."

Sir John Goodwin concluded his speech by expressing admiration for the noble sacrifices which had been made, and stated that the sacrifices would be a source of pride to the Middlesex Hospital Medical School for all time. He then unveiled the memorial tablets, which were dedicated by the Bishop of London, and opened the new common room.

The Welsh National Medical School.

An appeal is being made to the county councils of Wales to undertake to contribute a sum equal to a rate of one-eighth of a penny towards the Welsh National Medical School. At the meeting of the Brecon County Council last week the Finance Committee recommended that the council should agree to make the contribution on condition that all other county authorities in Wales and Monmouthshire did the like. Two amendments were moved, one proposing that a grant should be made unconditionally, and the other that the council refuse to make a grant under any conditions. Both amendments were rejected and the recommendation of the Finance Committee adopted.

Scotland.

Medicine and Credulity.

Professor Edwin Bramwell delivered his inaugural address as Moncrieff-Arnott professor of clinical medicine in the University of Edinburgh on October 30th. Principal Sir Alfred Ewing, who presided, said, in introducing Professor Bramwell, that they were welcoming the distinguished son of a distinguished father. The subject of Professor Bramwell's address was "The progress of medicine and the retarding influence of incredulity."

After briefly reviewing the history of the progress of medical knowledge, he said that all advance had been founded upon observation and a correct appreciation of the relationship of cause and effect. Mysticism, superstition, and an undue veneration for authority had been the chief factors which from time to time had retarded progress. Various forms of mental healing were popular at different periods, and yet, if the general public only knew it, these were merely adaptations of psychotherapeutic measures which physicians were constantly employing, and the results obtained were no more striking than those obtained by the physician. The difference, however, lay in the fact that medical men applied their treatment with intelligence and did not advertise their cures, while the unqualified practitioner, who depended upon advertising for success, reported his cures and made no mention of his failures. The influence of the press upon

public opinion was far greater to-day than ever before. While the medical profession recognized that for the most part the press was doing all it could to further the progress of science and of medicine, no one would deny that some of the daily papers were largely responsible for perpetuating that spirit of credulity which was so detrimental to the public interest. It was obvious that competition among newspapers was responsible for this state of affairs.

The association of the Church with medicine had been of the closest from the earliest days. To affirm that the deepest religious conviction was compatible with the highest scientific attainment was to admit a fact which was universally acknowledged. Doctors recognized that the minister of religion might be their most trusted ally. All who believed in the existence of a Creator would agree that both the possibilities of scientific progress and of treating disease were dependent upon the will of God. No doubt the minister would be right were he to say that this was not sufficiently realized by the patient. When the minister, as he often did, impressed the patient with this fact and at the same time strengthened the patient's faith in the ministrations of the doctor, he was doing a inestimable service to the cause of medicine. When, however, he proceeded to analyse causes and effects in so far as they had any relation to the practice of the healing art, then, Professor Bramwell ventured to believe, with all due deference, the minister was entering a province for which his training did not fit him.

The Aberdeen Medico-Chirurgical Society.

A meeting of the Aberdeen Medico-Chirurgical Society was held in the Society's Hall on October 26th, when Dr. Scott Riddell delivered his presidential address on "The records of the Aberdeen Medico-Chirurgical Society from 1789 to 1922, with some recollections, recommendations, and reflections." He explained that in process of preparation certain sections of the address dealing with the early history of the society, of its association with the infirmary, and of its relations with the medical schools and universities of Aberdeen, had expanded so considerably as to preclude the possibility of oral delivery at one session. The address had therefore been recast, largely added to, and put in permanent form, so that the members might have a complete narrative at their disposal. A copy of the published history of the society—an illustrated book of some 150 pages—was handed to each member after the address. Professor Marnoch expressed the thanks of the society to the president for his interesting address and for the trouble he had taken in preparing and publishing a history of the society as a record of its work and influence during the past hundred and thirty-three years.

At the first business meeting, held on November 2nd, Dr. J. S. Anderson of the City Hospital, Aberdeen, read a paper on "Meningismus." After a brief historical note he mentioned the difficulty arising in the diagnosis of certain cases which show pyrexia associated with severe cerebral symptoms, such as headache, mental dullness, or even head retraction and coma, and he urged the necessity for co-operation with the laboratory in the diagnosis. In meningismus cases, where the cerebro-spinal fluid was said to be normal, the laboratory supplied the essential criteria. These were (1) transparency, (2) no increase of globulin as tested by the Noguchi method, (3) power to reduce Fehling's solution, (4) absence of precipitation in the colloidal gold test, (5) a cell count of five cells or less per cubic millimetre. In an analysis of 25 cases of meningismus Dr. Anderson referred to the underlying diseases, the incidence among children of school age and under, and the symptoms. He considered that Kernig's sign was occasionally present in cases other than uraemia, and that the uncertainty regarding its presence was due to differences in the method of eliciting it. Comment was made on the excellent prognosis and the immediate benefit obtained by lumbar puncture, repeated if necessary; a urea estimation of the cerebro-spinal fluid should be made in any doubtful case. The paper was discussed by Professor Ashley Mackintosh, Sir Henry Gray, and Drs. Cruicksbank, Souter, Richards, Skinner, and Colt, and on the motion of the president, Dr. Anderson was cordially thanked for his interesting paper.

The Joint Hospital Scheme for Aberdeen was considered, and it was unanimously agreed on the motion of Dr. Scott Riddell, seconded by Professor Ashley Mackintosh, that the society express approval of the proposed Burnside-Foresterhill site.

Suspected Food Poisoning.

The Scottish Board of Health has received from Mr. Bruce White, B.Sc., of the Pathology Department of Bristol University, the report on his examination of the materials sent to him in connexion with the case of suspected food poisoning that occurred at Rosewell, Midlothian, in September last. It will be remembered that three children of a farm labourer were affected in this outbreak, and that the youngest child, a girl aged 3 years 10 months, died, the suspected cause of the illness being tinned pears. The materials sent to Bristol were subjected to exhaustive bacteriological examination, but no positive evidence that the illness was due to direct bacterial infection has been obtained. On the contrary, the evidence was strongly against the presence of any such primary infection. This, however, does not preclude the possibility of the illness being due to the activity of toxins of bacterial origin.

Ireland.

Ulster Medical Society.

The opening meeting of the session of the Ulster Medical Society was held on November 2nd in the Medical Institute, Belfast. The retiring president, Dr. R. Hall, introduced his successor, Professor R. J. Johnstone, M.P., who took the chair. The President then proposed a hearty vote of thanks to Dr. Hall for his conduct in the chair; this was seconded by Dr. Colville, and passed with acclamation. In his inaugural address the President made sympathetic reference to the deaths during the year of four Fellows—Dr. Brice Smyth, of Belfast, the father of the profession in Ulster; Dr. St. George, of Lisburn; Dr. Wilson, of Castleblayney; and Dr. Washington Tait, of Downpatrick. He then dealt with the subject of his address, "Some aspects of pain in gynaecological practice." Complaints of pain, he said, were ever present in the doctor's ears; its constant recurrence, its variations in the same patients; the same kind of pain apparently arising from diverse causes, all rendered judgement difficult. Films were thrown on the screen showing the nerve supply of the female organs, and the sites of the referred pain in different diseases. Professor Johnstone said that the ovary was often blamed when it was innocent, and escaped censure when it was guilty. Pain was considered ovarian, but examination or operation had revealed chronic faecal accumulation in the caecum, cervical erosion, a stone in the ureter at pelvic brim, or adhesion to a coil of intestine. If the tissue of the ovary was slowly distended, pain was absent, but if the distension was rapid, as by haemorrhage into a cyst, pain was marked. Other causes of true ovarian pain were mentioned, and Professor Johnstone said that his experience was that it was seldom or never necessary to remove both ovaries in entirety, always some healthy tissue was found. The uterus was most tolerant; it could be torn, displaced, bent without pain; and cancer of the cervix was also free till adhesions formed or glands enlarged. In the later stage of cancer there should be no quibble as to free exhibition of opium. Dr. John Campbell, M.P., proposed a cordial vote of thanks to the President for his address; such a paper proved the great advance in diagnosis and treatment that had taken place in the last thirty years, and the broad and scientific base on which they were built; Dr. Thomas Houston seconded.

The President welcomed Major-General Gibbard, D.D.M.S. of the Irish Command, who was present at the meeting. Dr. John Campbell drew attention of the meeting to the selection of Sir William Whitla as candidate for the Imperial Parliament, and asked those who were entitled to sign the nomination paper. A special general meeting was held immediately after the opening meeting. The Honorary Treasurer, Dr. Turkington, made a statement on the finances, which showed a deficit each year for the last few years. The Council recommended that the subscriptions should be raised 50 per cent. This was proposed by the Honorary Treasurer and seconded by Dr. W. Burns. Dr. Lee proposed and Dr. Robin Hall seconded that the original subscription be retained for members for two years after their graduation. Dr. Rentoul, Dr. Ritchie, and Dr. J. R. Davison also spoke, and Mr. Mitchell offered to join in a fund to clear off the deficit. The original proposition as amended was passed unanimously.

Limerick City Home Hospital.

At a recent meeting of the Limerick medical practitioners in connexion with the proposal of the Health Committee to

dispense with the services of the two visiting surgeons, the following resolution was passed:

"We, the medical practitioners of Limerick, have learned with surprise that it is proposed to dispense with the services of the two visiting surgeons to the Limerick City Home and Hospital, and to replace them by a junior resident doctor. We protest very earnestly against this change as involving a great injustice to two gentlemen who have for more than twenty years efficiently and faithfully discharged their duties to this institution; and also a great injustice to the poor, who will be thus deprived of the services of those very experienced practitioners; while to ratepayers any saving effected will be so trifling as to be absolutely negligible. We would point out that it is quite illegal for any medical man who is not an apothecary to compound the prescription of another."

Correspondence.

THE DOSE OF THYROID.

Sir,—My attention has been drawn by my pharmaceutical colleagues to the dose of dry thyroid gland which is given in the *British Pharmacopoeia* as 1/2 to 4 grains. Physicians using the gland in hospital practice generally prescribe it in this form, which is dispensed in the hospital; and it is in this way that students obtain their knowledge of the dose and uses of thyroid.

In private practice the gland is given almost always in tablet form, and the dose is weighed as fresh gland, which represents only about one-fifth of the dry gland. That is, if the physician orders 1 grain of thyroid gland the patient receives 1/5 grain of the *British Pharmacopoeia* thyroideum siccum.

I have reason to know that misunderstanding of these facts has occurred.—I am, etc.,

Cambridge, Nov. 7th. W. E. Dixon.

INSULIN AND DIABETES.

Sir,—The General Statement of the Physiological and Therapeutic Effects of Insulin, published by Professor Macleod in the Journal of November 4th, leads me to place on record certain results of work with which I have been engaged for the past three years. The full particulars of this work I hope to publish shortly. Some of the provisional conclusions that I had reached were set forth in a lecture which I delivered before the Birmingham Branch of the British Medical Association a year ago.

It is now established that, in normal animals and man, after the ingestion of glucose by the mouth there occurs a definite transitory increase in the sugar of the blood, the extent of which may be fairly accurately determined by repeated estimations of the blood at short intervals before and after the administration of the glucose.

It occurred to me that it would be interesting to ascertain whether the extent and duration of the normal alimentary hyperglycaemia could be modified by intravenous injections of a boiled and filtered watery extract of the pancreas which conceivably would contain Cohnheim's substance.

For the purpose of experiment I chose rabbits. The blood sugar curve was determined after 10 grams of glucose had been introduced into the stomach by a tube. A week later with the same animals I determined the curve in exactly similar conditions except for the intravenous injection of a small quantity of the extract. The result was very striking, for the alimentary hyperglycaemia which was very definite in the first experiment was entirely absent in the second. I confirmed the result with other rabbits, and none of these animals suffered any apparent ill effects.

The next step was to conduct a similar experiment on a normal man, and inasmuch as my colleagues at the General Hospital were doubtful if such an experiment was justifiable I injected the extract into my own vein, and obtained a considerable flattening of my normal blood sugar rise after a dose of 50 grams of glucose by the mouth. Subsequently I had a headache and felt ill for a few hours, but so far as I know the injection had no ill effect. I next injected the extract intravenously in a diabetic after a standard test-meal, having previously determined the response of the blood to this meal. In this case I obtained a slight fall in the hyperglycaemia, but the effect was in no way comparable in degree with the fall obtained in my own case. In this patient I later injected the extract several times in one day, but only succeeded in reducing the hyperglycaemia slightly. She complained of severe headache and of feeling ill, but recovered her usual state of health in a few hours.

About this time a rather startling fatality occurred in one of the laboratory animals, and I was led to conclude that the doubts of my colleagues as to the propriety of human experiment were sound, and I felt I had discounted my own malaise and my patient's evident illness after the injections a little too lightly.

Dr. Hillier, at the General Hospital, at this stage very kindly undertook to examine the pancreas of different animals in order to discover the distribution of the islets of Langerhans with a view to obtaining a more potent extract of the islets by using only those portions of the pancreas in which they appeared more numerous. It is worth while recording that Dr. Hillier and I found that our crude extract, which produced such remarkable effects on intravenous injection, was quite inert *in vitro*.

About this time I had the opportunity to investigate the effect of intravenous injections of other substances than the crude pancreatic extract I had been using. In a patient undergoing treatment for asthma I found a lowering of the curve after an intravenous injection of peptone. I have since found that salvarsan intravenously and even T.A.B. vaccine limits the normal alimentary hyperglycaemia after 100 grams of glucose in some patients.

I came to the conclusion that the results that I had observed after the injections of pancreatic extracts were non-specific. For this reason, until I have had an opportunity of examining the controls practised by the Toronto School, I shall reserve my judgement of the ultimate value of insulin. The crucial test will be that of clinical experience.

It would take too long adequately to discuss the significance of the curious fact that injections which flatten the alimentary curve in a normal person only very slightly reduce it in the case of a diabetic. I have had no experience of work with animals after pancreatectomy, but I still remain a little sceptical after fairly extensive reading of the literature whether the condition of animals after that operation is exactly equivalent to the extraordinary variety of conditions in man which are collected under the name "diabetes."—I am, etc.,

Birmingham, Nov. 7th. A. P. Thomson.

THE OBJECT OF INVESTIGATION AT THE ST. ANDREWS CLINICAL INSTITUTE.

Sir,—From the notices that appear in the medical and lay press there is some danger that our modest enterprise here may become fashionable before it is understood. Some teachers tell us that they have been doing for a long time what we are attempting, in that they have kept in touch with the out-patient department and taught students the early symptoms of disease. I have been engaged in the study of these early symptoms for over thirty years, and if I were asked to teach students this subject I would decline, for the simple reason that my knowledge is too scant.

Medicine is to-day so befogged that it cannot see the path of progress nor understand its own limitations. A consideration of the state of knowledge on some subjects and a glance back over the course which medicine has pursued may reveal where it has gone astray. In the middle of last century the study of diseased organs, as revealed on the *post mortem* table, attained such importance that pathology was assumed to be the foundation of medicine. It was imagined that the nature of ill health and the cause of death could be found there. In consequence of this physicians began to search for the signs of damaged organs during life, and so laid the basis of that diagnosis by physical signs which has ever since dominated clinical medicine, and thus diverted attention from the real cause of ill health.

No doubt pathology is of great value, but the mistake lay, as happens so often in medicine, in expecting a subject to yield a kind of information which it is not capable of doing. The examination of a dead body may reveal a damaged cardiac valve or an inflamed lung, but these are not the causes of death, nor do they account for the symptoms of the antecedent ill health.

The body is maintained in health by the harmonious working of all the organs. Each organ possesses a mechanism which regulates its function, so that the organ is able to meet the ever-varying demands made upon it by the conditions of life. It is the disturbance of this mechanism which provokes the condition of ill health and leads to death. The damaged organ, and particularly the impaired function of the organ, may occasion this disturbance of the regulating mechanism, thus producing the symptoms of ill health or causing death. The change in the organ itself is only an agent which may originate the disturbance. In the same way ill health due to microbic invasion is not due to the microbe, but

to the disturbances set up by the microbe or its toxins. When we reflect upon the great expectations raised by the introduction of bacteriology, and consider the meagre results it has achieved in the elucidation of the diseases common among the people, we will find the cause of this failure to be that bacteriology has devoted itself entirely to the study of the supposed agent of disease, and not at all to the disturbed processes which constitute the disease. This, perhaps, will be better realized if we consider the question of the danger of chloroform anaesthesia. The examination of the body after death has failed to throw any light upon the question. The great number of investigations by "experts" of various sorts—singly and in groups—have failed to indicate the nature or source of the danger. The reason seems simply to be due to the fact that chloroform acts by disturbing the processes concerned in regulating the function of organs, and medical knowledge has not advanced so far as to enable anyone to appreciate the nature of these processes.

If this aspect of the subject is grasped it will be at once apparent why the numerous investigations into medical problems so frequently fail. Indeed, on the same grounds one can forecast with certainty the failure of most projects that are being attempted to-day.

Progress depends more on recognizing the cause of failure than on the contemplation of success. One great cause of the failure of medical investigation is that investigators undertake the solution of the problem without realizing that they have not the requisite knowledge. It wants no prophet to foretell that an enterprise which requires knowledge of a certain kind will fail if it be undertaken on the assumption that that knowledge exists when it does not exist. This is the reason of the failure in many, if not in all, of the wrecked enterprises with which the path of medicine is strewn.

In the enterprise we have set ourselves we have taken the first step—the recognition that we do not yet possess the knowledge necessary for its achievement. Our present duty is to train and educate ourselves. We see that before we can detect and appreciate the significance of the early symptoms of disease we must know the mechanism of these symptoms. We have gone so far as to recognize that most symptoms are due to the disturbance of that mechanism which regulates the function of the organs, and we are endeavouring to understand this mechanism. It is a field of knowledge which is to all intents and purposes unexplored, for we find the knowledge lacking which would enable us to understand the nature and significance of the simplest symptom—such as, for instance, the mechanism of an increase in the pulse rate, of a cough, of nausea, of vomiting, of pain. Hitherto the profession has contented itself with the idea that as much of these symptoms was known as was necessary for practical purposes. So long as this delusion prevails no progress can be made.

An inquiry into the mechanism of this process, which regulates the functions of organs, how it is disturbed, and the agents that cause the disturbances, is the object of our investigations at present. What further steps will have to be taken are at present hidden from us. But of this we are assured, that until this kind of knowledge is acquired there is no prospect of the real problems of disease ever being solved.—I am, etc.,

St. Andrews, Fife, Nov. 2nd. J. MACKENZIE.

X RAYS IN HYPERTRICHOSIS OF THE FACE.

SIR,—Having read Dr. H. C. Semon's letter in your issue of November 4th, I cannot help feeling that he has said both too little and too much. Too little, inasmuch as he gave no details of the technique employed as regards filters, dosage, and exact frequency of application; too much because, though the case he refers to was treated presumably in accordance with the imperfect technique of eleven years ago, he applies his generalizations to present-day methods. I do not dispute that his deductions may be right, but if the same method of reasoning, and the adage, "*primum non nocere*," had been applied to various medical and surgical modes of treatment of many diseases a dozen years ago, would not both medical and surgical progress have been retarded? It is by trial and error that we progress.

Twelve years ago many leading engineers and physicists said heavier than air flying machines were impossible. To-day we know they were wrong. Twelve years ago Dr. Frank Schultz of Berlin condemned the *x*-ray treatment of hirsuties. Last year Dr. Thurstan Holland said nothing would induce him to treat hirsuties with *x* rays, and both were men of great experience; but for 2,200 odd years we considered Euclid infallible till Einstein came. And so it may be again. I have been carrying on the active practice of *x*-ray treatment for only sixteen years, and so will not venture to dogmatize any more than Dr. Semon. Still, it is helpful if the least of those amongst us contributes his quota of experience and judgement.

Ten years or more ago I had the misfortune, while treating tinea tonsurans, to cause permanent alopecia on a number of heads without any immediate or subsequent dermatitis. During the past five years I have treated over 1,000 cases of the same sort without failure either way. The beard is, of course, quite a different proposition; still it is difficult to see why, if permanent alopecia can be accidentally produced on the head without bad results to the skin, it cannot also be induced in the beard likewise, and I believe it can. During the last seven or eight years—before I had Erlangen apparatus—I had to administer post-operative prophylactic irradiation to several adult male patients with various malignant conditions about jaws, mouth, and tongue, and my method was to treat once a fortnight, giving 1 B pastille dose measured through 3 mm. of aluminium, about twenty such doses being given. In each case I produced permanent alopecia of the beard over the treated areas, and in none have any atrophic changes appeared on the skin, which is soft, elastic, and of normal colour.

Applying the same technique to hirsuties in young females I have obtained similar results, although sufficient time has not yet elapsed to guarantee that no telangiectasis will follow. In each case I warned the patients of the risks, and they were willing to take them. Hypertrichosis in a young and pretty girl is a very serious condition as it tends to become a bar to marriage and has led sensitive natures to suicide. I think therefore we must make every effort to find a remedy. They all abhor the idea of shaving—which is really the safest and best remedy—chemical depilatories by congesting the skin only make the growth of hair stronger, and electrolysis, besides being only a partial remedy, disfigures the face as much almost as *x*-ray atrophy. In the early days of *x*-ray therapy, when we had no proper mode of measuring doses, when our tubes were all too soft as a rule, when we treated too frequently, thereby producing a summation of doses sufficient to induce erythema, and when we used no filters, nearly every case developed atrophy. We then had ample opportunity of studying this terrible condition. Since the introduction of aluminium filters I have found telangiectasis follow the use of a 1 mm. filter frequently; I have also seen it follow a 2 mm. filter though much less frequently, but although I treat many thyroids in cases of Graves's disease I have not yet seen telangiectasis follow through a 3 mm. filter.

To sum up, then, my view is that hirsuties treated at monthly interva's through a 3 mm. filter, or preferably a 4 mm. filter, giving 4/5 B to 1 B doses on a London pastille, and giving up to twelve to fifteen treatments, good and safe results may be obtained.—I am, etc.,

Bradford, Nov. 4th. WILLIAM MITCHELL.

ALLEGED FAULTS IN MANUFACTURE OF NEO-SALVARSAN AMPOULES.

SIR,—One fatality and some toxic phenomena having been observed in the Lock Hospital in Cairo, some of the salvarsan ampoules were handed to us for investigation. The tubes were suspected to be faulty and to have allowed decomposition of the contents, for the following peculiar but interesting reason. On immersing the tube in alcohol the contents became sticky and adhered to the glass, and it was thought that this meant that alcohol had penetrated into the interior of the ampoules. We verified the statement as to stickiness, but we further observed that this condition of stickiness did not appear till after withdrawal from the alcohol and then only lasted a brief time, after which the contents became as powdery as before. It seemed clear that there must be some special physical explanation of this very peculiar phenomenon, for there were certainly no holes in the capsules. The phenomenon was found to be exaggerated when ether was used in place of alcohol. This gave the clue to the mystery. We immediately plunged the ampoules in ice and found that the powder in them again adhered strongly to the glass even more than with alcohol or ether. We had already found that the contents of the ampoules were under reduced pressure.

The explanation of the phenomenon is therefore as follows:

On removing the ampoules from alcohol or ether the surface evaporation cools the ampoules just as they are directly cooled by the ice. In all three cases the cooling increases the vacuum, especially of the spaces between the particles of the light powder, and the powder and the walls of the ampoule; doubtless this is because the glass and the solid powder conduct and absorb heat more quickly and to a greater degree than the air within the ampoules. The particles of powder once brought together by the contraction of the imprisoned air now adhere by cohesive force until shaken apart. That the phenomenon only occurs with certain powders is probable. It is also possible that traces of vapour within the ampoules may be deposited as dew on the particles and on the walls of the vessel and aid cohesion, but this would not be easy to prove. The important fact, however, and the one to which we desire to draw attention, is that the explanation lies in the contraction due to cooling, and the phenomenon is purely physical and may be repeated at will; it does not in any way show the capsules to be unsound. On the contrary, it probably only occurs when the capsules hold a partial vacuum. Although anyone looking at the capsules when quickly cooled would almost assuredly assert that the powder was wet, this is not the case. After a few seconds' standing and shaking the powder looks dry again. Examination of the ampoules for toxicity revealed no special potency of this preparation as compared to other batches.

We think these observations worthy of record because we have not heard of a similar report, and certainly at the time of the accidents due to the injections the suggestion that the cause lay in faulty ampoules caused much alarm. We also think the observation may be of interest to manufacturers, because it might again happen, as it certainly has happened here, that many a medical man would think the manufacturer at fault and get his preparation elsewhere. The thin ampoules show the phenomenon best because they so readily respond to the cooling, and thus neo-salvarsan put up in thick tubes appears drier than that in the thin tubes. In our samples the French neo-salvarsan of Poulenc Frères was in thin capsules and the German preparation in thick. As we have shown, there is no ground for the idea that the ampoules were at fault in any way.—We are, etc.,

EGERTON CHARLES GREY,
Professor of Chemistry.
REGINALD S. A. HEATHCOTE,
Professor of Pharmacology.
Government Medical School, Cairo,
Egypt, Oct. 17th.

THE RADICAL PREVENTION OF VENEREAL DISEASE.

SIR,—I for one cannot agree with the recent letters of Dr. Herbert Caiger. What is needed is a clean-cut understanding of our line of action, and when the subject is crystallized out it resolves itself into one of discretion only. A man is wise for himself.

Dr. Caiger's disparaging remarks about the administration of Moses shows a lack of humility, as if we had improved on his system of government. Circumcision was not instigated to prevent venereal disease, though it lessens the risk. There was probably no syphilis in the time of Moses, and this alone made it more evident that other deterrent influences should operate. Dr. Caiger complains of the use Moses made of fear in establishing an A1 nation, and in "doing justice to St. Paul" he seems to think there was no fear in St. Paul's teaching. How comes it, then, that a man "must work out his own salvation with fear and trembling"?

What, then, are our means by which we can prove our friendship towards the youth of the nation? Shall we preach indulgences and recommend appliances and disinfecting agents, and so call evil good? By these means we might possibly, but not probably, stamp out syphilis, but the remedy would be a hundredfold worse than the disease, inasmuch as it would lead to a universal physical weakness and degeneracy unparalleled in history. We should then be under the obligation of stamping out the means itself, for mental as well as physical abnormalities come under our sphere. Shall we show reckless disregard and allow a nation to become thoroughly syphilized? This would lead to a worse degeneracy, and although the fear of syphilis would disappear on account of the loss of its virulence, other fears of a worse type would take its place.

Neither of these methods is admissible, although most of us would rather see a youth escape even though he escaped by the means of those who preach indulgence. But considering there is more than enough indulgence, why need this be preached? It is enough in the interest of knowledge to barely mention it, but to strike out the fear of consequences is to head for the day of calamity.

We are therefore left with the only one safe method—discretion—and our only weapon is fear. The windy doctrines of morality and patriotism take no hold on youth. In teaching youth discretion it is well to try to recollect that we were once young ourselves, and to recall to mind the special proclivities and early canker in even the fairest of flowers. The hereditary uprightness is more marked in youth than in age, when faith tends to become weak and idols strong. Fear, therefore, has more terrors and is consequently more powerful. The fear of a broken spirit, the clipped wings shutting off the vista of future happiness, sinks more into the heart of youth than any amount of proffered mythical fruit of modern towers of Babel. Who are they who have pulled through? The discreet ones, those whose teachers have struck fear into their hearts, medical students (caught young) and ambulance men who have dusted with calomel the condylomata of others, and those who have taken heed to the acceptable words of sensible men.

In rebuking youth, as in rebuking anyone else, the rebuke to be of any good must be terrible. Hard words are not necessarily unkind words. The sting of the rebuke must be directed against those whom it is intended to benefit, not against the cause, so that justice may be tempered with mercy.—I am, etc.,

Huddersfield, Oct. 31st. T. DOBSON POOLE.

SIR,—I am interested to read the letter by Mr. E. B. Turner in your issue of October 28th. I lectured to the soldiers and officers at the Tooting Grove Military Hospital, but not to such a great number as he refers to.

I certainly could never see any reason for appealing to their patriotism, as I considered that they had shown this in volunteering to go to the front and risking their lives, when we had so many who were trying to avoid service abroad by various means. It was natural that these men, full of virility, should, owing to the slackness of the authorities, contract disease. The Government took no steps whatsoever to protect these young men. I am certain that if the diseases had been made notifiable and all sufferers isolated the number of cases would have been considerably reduced. As it was not a notifiable disease the authorities were unable to deal with the cases of men who wilfully, maliciously, and of aforethought spread the disease.

About 10 per cent. of the officers at Tooting Grove did not appear to be very anxious to get well, and during their sojourn in the hospital, and while under treatment and the disease in an active state, they broke bounds and spread their complaint among the residents in the neighbourhood. When this matter was brought before the colonel of the hospital he had no method of dealing with it satisfactorily, and referred the cases to the G.O.C., who came down and gave a lecture to the officers, in which he stated that he knew that none of them would forget they were officers and gentlemen and would stoop to such a thing as spreading infection, but at this time he had had brought to his notice the names of over fifty officers who had committed this offence.

The fact is there was no law to deal with the matter, the diseases not being notifiable. Some of the most patriotic men in the world have contracted these diseases. In fact this class of man is the most liable to err in this direction.

I am certain there is only one way of stamping out these diseases, and that is by dealing with them as we have with other contagious diseases. If the number of innocent victims who get infected year by year were known I am certain that public opinion would compel the authorities to act in this matter.—I am, etc.,

London, W., Nov. 4th. JOHN ARMSTRONG.

SIR,—In the BRITISH MEDICAL JOURNAL of October 28th (p. 827) my friend the enemy of self-disinfection, Mr. E. B. Turner, protests against the inference conveyed in my letter in your issue of October 21st, that numbers of men deliberately allowed themselves to be infected with venereal disease to escape the firing line.

My reply in detail is:

1. *British Troops.*—In August-September, 1917, over 5,000 troops came on leave to Paris, and 1,038—over 20 per cent.—became infected, no calomel tubes being issued; but when calomel tubes

were issued and prophylactic lectures given from November 8th, 1917, to March 31st, 1918, and nearly 30,000 troops were on leave in Paris, the medical officer in charge stated that the venereal disease rate had been reduced to only 3 per cent., and that, "of this 3 per cent., it was ascertained by questioning the men personally that . . . one-third wanted to contract venereal disease because they preferred to be in hospital to being in the front line."

2. *American Troops.*—Venereal disease was quite well recognized as a self-inflicted disease among the American troops, and orders were issued warning officers to watch for "wilful infections"—sometimes sought for trivial reasons, such as obtaining a change of Command (vide *Manual of Military Urology*, issued by American Red Cross, 1918). For example, p. 20: "Requisites of treatment of venereal disease:—I. Soldier treated in his own unit to save wastage; 1. To treat the soldier as far as possible in his own command *lest venereal disease be made a convenient excuse to escape military duties.*"

3. *English Prostitutes.*—Diseased women on the streets of London and elsewhere offered sexual intercourse to soldiers at a higher price because of being diseased. The Canadian, Australian, and New Zealand authorities made special reports to the British Government on the matter, and tried without avail to get these women isolated.

4. *English Soldiers.*—During the war English soldiers were reported for buying and selling tubercle sputum and venereal discharge, and in other ways seeking different forms of self-inflicted diseases. Some men wilfully infected their own eyes, not knowing they would become blind.

These facts can quite well be verified by Mr. E. B. Turner in the proper quarters—namely, in the experiences of Army Commanders, medical officers in charge of venereal disease isolation hospitals, general hospitals, casualty clearing stations, convalescent camps, etc. Among our soldiers there were many saints and more heroes who can rightly claim our highest love and admiration; but alas, there were also many frightened men, worn-out men, mad men who committed cowardly and antisocial acts, yet for whom, nevertheless, those of us who really *know* war have only an infinite pity.—I am, etc.,

London, Nov. 2nd. ETTIE A. ROUT.

POST-GRADUATE COURSES.

SIR,—I am a member of the post-graduate class now enjoying a series of clinical demonstrations at the Royal United Hospital, Bath, and a notice of the work being done may be of interest.

The medical staff of the hospital have arranged a series of six demonstrations: they are open without fee to all practitioners, and the attendance of the two so far held has been very good, some thirty medical men of the city and the country round being present.

At the first class, cases of lymphadenoma and pernicious anaemia were shown and a short clinic was given on these cases and a case of splenic anaemia which had been successfully operated on; the spleen and films of blood from the different cases were then shown by the pathologist, who also gave a demonstration of blood grouping tests. Then a blood transfusion in a case of pernicious anaemia was done in the theatre.

At the second clinic a gastro-enterostomy was performed and a case operated on for gall stone; each operation was preceded by a short lecture. The pathologist then showed methods of examining stomach contents, and afterwards *x*-ray photographs of stomach and bowel were shown.

The remaining clinics are to deal with kidney, heart, nervous, and orthopaedic cases, and with any other cases of surgical or medical interest that may occur.

The staff most hospitably provide tea at the end of each meeting. That the greatest interest is taken in these lectures by everyone present is obvious, and one cannot but realize what a profound effect this sort of course must have not only on the work of each medical man but also on the whole medical service of the neighbourhood, including insurance service and the hospitals.

How much this sort of thing must do to make general practice more interesting and enjoyable those who have long practised without this advantage are possibly the best judges, and as one of them I felt it would be but bare justice and gratitude to give some idea of what is being done.—I am, etc.,

October 30th. A RUSTY G.P.

PERIODICITY OF GNAT BITES.

SIR,—It is a matter of common observation that the site of a gnat bite is subject to recurrent irritation at periods of twenty-four, forty-eight hours, etc.

Allowing that the primary irritation increases local vascularity and so aids the insect to get her fill of blood, it is not so clear how, or why, the subsequent irritations occur.

May I ask for any information which can elucidate the subject?—I am, etc.,

Ringwood, Hants, Oct. 25th. WM. OLIVER BEDDARD, M.D.

Obituary.

LEOPOLD GEORGE HILL, M.D.Dunelm., M.R.C.S.,

Physician to the Church Missionary Society.

DR. LEOPOLD HILL, whose death took place in London on October 26th, was a student at the London Hospital during the late eighties and early nineties. He obtained the M.R.C.S. and L.R.C.P. diplomas in 1893, and the M.D. degree of Durham University in 1911.

Dr. C. F. HARFORD writes:

Leopold Hill was one of a large body of students at that period who were led to see, in a manner which has hardly been repeated since, the imperative call of medical missions. It is difficult to interpret the meaning of those movements which affect certain periods of history, and without inquiring too closely into the influences which specially brought Hill to his decision, yet one who was practically a contemporary can trace something of the inward secret of this remarkable period. In the first place, there was the new realization of the meaning of Christianity and the spiritual life which was associated with the work of two humble Americans, Moody and Sankey. They succeeded in showing to the young people of that day that the Christian religion was not a mere matter of forms and ceremonies but a vital force which could not only transform individual lives but the world.

The most sensational development of that period was the going forth of "the Cambridge seven," a band of leading athletes headed by C. T. Studd, perhaps the best all-round amateur cricketer of his day. The same spirit touched the medical schools of this land, and one who fanned the flame of enthusiasm and directed it into most useful channels was the late Dr. J. L. Maxwell, formerly a Presbyterian missionary in Formosa, and a real leader of men. Hill, like others, came under Maxwell's influence, and his sound common sense led many to see that medical missions demanded a good all-round medical training as a partner to the missionary spirit, both of which are essential to the making of a medical missionary.

The London Hospital received a considerable number of those who were definitely preparing for this special service, and Hill was a popular and particularly well qualified man who emerged from that band of students. Hill offered his services to the Church Missionary Society, and was fortunate in being assigned to Pakhoi in South China, where he was associated with Dr. Horder, who already had organized a well-equipped hospital and leper asylum. In the development of this Hill took a prominent part, and the influence of the hospital affected a very wide area, while the leper work was of a particularly high order. South China has been fortunate in securing the services of a series of eminent medical practitioners in its varied centres, Manson and Cantlie having been among the number, and Hill took his share in the work for the Imperial customs and consular service. On being invalided home in 1904 he took up busy work as a general practitioner in North London, in which he was engaged up to the time of his death. While doing this he held the post of physician to the Church Missionary Society from the year 1911, and worthily maintained the traditions of this great office, which is concerned with the physical needs of about 1,400 individuals scattered mainly throughout the tropics. Hill's careful clinical methods and sympathetic manner earned for him the respect and confidence of the medical board and of the society generally, and he was beloved by all his colleagues.

THE LATE PROFESSOR CRUM BROWN.

SIR JAMES WALKER, F.R.S., Professor of Chemistry in the University of Edinburgh, has been good enough to send us the following brief appreciation of his predecessor: "As Crum Brown's pupil, friend, and successor I am glad to be allowed to add a few lines to Dr. Ballantyne's obituary. The student of medicine who listened to his lectures during a winter session could form little idea of his scientific eminence; to science students his advanced lectures on organic chemistry were a revelation. Philosophical and suggestive, they compelled the listener to think; but it was after all the delightful laboratory talks which constituted the chief feature of his advanced teaching. He was always ahead of the time—even

his thesis written while still a medical student was a decade in advance of the views of the ordinary professor. I have often found that novel theories beginning to attract attention had to me the aspect of familiarity, and this familiarity I could always trace to some conversation I had had with Crum Brown. Had he been tinged in the slightest degree with ambition he would have been recognized as one of the foremost theoretical chemists of the age. As it was, his merits were known to comparatively few, but their admiration of his great gifts is unbounded."

THE death took place recently of Dr. W. F. LITCHFIELD, of Glebe Point, Sydney, at the age of 51 years. He was born in New South Wales, and was educated at Newington College and the University of Sydney, where he graduated M.B., Ch.M. in 1893. He was for three years resident medical officer, and afterwards for more than twenty years honorary physician to the Royal Alexandra Hospital for Children; he was a member also of the Board of Directors. He was president of the Section of Paediatrics at the last Australasian Medical Congress in Brisbane (1920). He was also a member of the councils of the Royal Welfare Society for Women and Children, and of the District Nursing Association; he was honorary physician for the Church of England Homes, Glebe, and a member of the board of directors of the Royal Alexandra Hospital for Sick Children. Dr. Litchfield took a great interest in the work of the New South Wales Branch of the British Medical Association, being a member of the Council for several years, medical secretary, and at the time of his death vice-president. As a young man he was keenly interested in debating societies, especially those at Glebe Point, and in later years was a popular member of the Drummoyne Golf Club. He has left a widow, two daughters, and four sons.

MR. CHARLES HOBHAM EVANS, F.R.C.S., died in London on October 21st. He was the fourth son of the late Dr. Evan Evans, R.N., and was educated at Edinburgh and at University College, London, taking the L.S.A. in 1885, the M.R.C.S. and L.R.C.P.Lond. in 1886, and the F.R.C.S.Edin. in 1912. He filled the posts of house-surgeon at the Miller Hospital, Greenwich, and at St. John's Hospital for Diseases of the Skin; and afterwards was surgeon for out-patients to St. Anne's Hospital. He was a member of the British Medical Association, and a Fellow of the Royal Society of Medicine. He joined the R.A.M.C. in the first week of the war, taking a temporary commission as lieutenant on August 12th, 1914, and was promoted to captain after a year's service.

DEPUTY SURGEON-GENERAL WILLIAM CARDEN ROE, Army Medical Department (retired), died at Bournemouth on October 6th, aged 88. He was born at Boris-in-Ossory, Queen's County, Ireland, on November 30th, 1833, and took the L.R.C.S.I. in 1854. Entering the army as assistant-surgeon on December 1st, 1854, he attained the rank of brigade-surgeon on November 27th, 1879, when that rank was first introduced, and retired on November 11th, 1880, with an honorary step as deputy surgeon-general. He served in the Crimean war of 1855–56, in the 89th Foot, the Royal Irish Fusiliers, and was present at the siege and fall of Sebastopol, receiving the medal with a clasp, and the Turkish medal. According to the Army List, there are now only four medical survivors of the great wars of the middle of last century; one who served in the Crimean war, two in the Mutiny, and one in both.

The Services.

DEATHS IN THE SERVICES.

Lieut.-Colonel Robert Talbot Beamish, R.A.M.C. (retired), died suddenly in London on October 26th, aged 73. He was born at Cork, educated at Queen's College, Cork, and graduated M.D. of the Queen's University, Ireland, in 1873, and M.Ch. in 1874. He entered the army as surgeon on February 3rd, 1878, he became lieutenant-colonel after twenty years' service, and retired on April 20th, 1901. He served in the Burmese war in 1886–87, receiving the medal with a clasp; and in the South African war, in the operations in Orange River Colony, where he was in charge of a general hospital, with the local rank of colonel, and received the Queen's medal with two clasps.

Lieut.-Colonel Michael Harris Thornley, Indian Medical Service (retired), died at Epsom on October 30th, aged 47. He was educated at Guy's, and took the M.R.C.S. and L.R.C.P.Lond. in 1897, the D.T.M.Liverpool in 1909, and the F.R.C.S.Edin. in 1910. He entered the I.M.S. as lieutenant on January 27th, 1900, obtained the rank of lieutenant-colonel on July 27th, 1919, came home on furlough preparatory to retirement last year, and actually retired so recently as October 8th last, three weeks before his death. He spent several years on military duty, during which he served in the Waziristan campaign of 1901–2, on the north-west frontier of India, receiving the frontier medal with a clasp. He then entered civil employment in Bengal, and, on the division of that province in 1911, was posted to the newly-formed province of Bihar and Orissa. There for the last few years he was civil surgeon of the important station of Cuttack, the headquarters of Orissa, and also superintendent of the Cuttack medical school and of the Cuttack lunatic asylum. He served in Egypt during the late war.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

AT a congregation held on November 4th the honorary degree of M.A. was conferred on H. R. Dean, M.D.Oxon., Professor of Pathology, who was presented by the Public Orator. The following medical degrees were conferred:

M.D.—H. W. Hales.
M.B., B.CH.—A. A. Prichard.

The Vice-Chancellor has informed the Senate that under the will of the late Sir William Dunn a further sum of £45,000 now accrues to the School of Biochemistry, making a total grant for the purpose of the school of £210,000.

It is announced that the General Board considers it desirable that a University Lecturer in Embryology should be appointed at a stipend of £250.

UNIVERSITY OF WALES.

THE following have passed the examination in Pathology and Bacteriology for medical and surgical degrees:

D. I. Bowen, D. A. Davies, D. T. Davies, *Edith M. Davies, *L. C. Edwards, Ann C. Evans, Martha Griffith, E. C. James, *T. G. I. James, *E. D. Owen, T P. Rees, Muriel A. Stephens, W. E. C. Thomas, Constance Walters.

* With distinction.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.

Harry Godfrey Massy-Miles Prize, 1922.

AT a meeting of the College on November 3rd the Harry Godfrey Massy-Miles Prize for the year 1922 was awarded to Dr. Michael Brandon Devane. Dr. Devane obtained over 80 per cent. of the possible marks in the Final Examination in Midwifery held by the Royal Colleges in March, 1922. The Harry Godfrey Massy-Miles Prize has been established in the Royal College of Physicians of Ireland by Mrs. Massy-Miles in memory of her husband, Captain Harry Godfrey Massy-Miles, M.C., R.A.M.C., a Licentiate of the College, who died of wounds received in France on April 18th, 1918.

Medical News.

THE joint committee of the Royal College of Physicians of London and the Royal College of Surgeons of England, which administers the trust founded by Mrs. Streatfeild for the promotion of research in medicine and surgery, has appointed Mr. Kenneth M. G. Bailey, M.B., L.R.C.P., M.R.C.S., to be a Streatfeild scholar. The subject of his research is infection of the urinary tract by coliform bacilli; it will be conducted at St. Bartholomew's Hospital.

THE Medico-Psychological Association of Great Britain and Ireland will meet at the Bethlem Royal Hospital, Lambeth, S.E.1, on Thursday, November 23rd, at 2.45 p.m., when the president, Professor G. M. Robertson, M.D., will give an address on the discovery of general paralysis, from Haslam to Bayle, and Dr. E. W. Scripture will read a paper on the treatment of general paralysis by malaria and the use of speech inscriptions for early diagnosis.

AMONG the members recommended for election to the Council of the Royal Society at its anniversary meeting on November 30th are Professor T. R. Elliott, M.D., Professor G. H. F. Nuttall, M.D., and Professor D. Noël Paton, M.D. Sir Charles Sherrington is again proposed as president, Sir David Prain, M.B., as treasurer, and Mr. W. B. Hardy, lecturer in physiology in the University of Cambridge, as one of the secretaries.

A MEETING of the Medical Officers of Schools Association will be held at 11, Chandos Street, W.1, on Friday, November 24th, at 5 p.m., when Dr. A. R. Friel will read a paper on the ionization treatment of otorrhoea. There will be a demonstration of apparatus used, and also lantern slides. A discussion will follow. All medical practitioners interested in the subject, as well as medical officers engaged in the treatment of otorrhoea at that treatment centre, are invited to attend.

THE Aberdeen University Club London dinner will be held on Thursday, November 16th, at Gatti's Restaurant, at 7 for 7.30 p.m. Dr. Milligan, 11, Upper Brook Street, W.1, will be very glad to hear from any past or present graduate wishing to attend.

THE annual dinner of the London School of Medicine for Women (Royal Free Hospital) will be held at the Holborn Restaurant on the evening of Friday, December 1st.

THE Harben lectures before the Royal Institute of Public Health will be delivered in the Lecture Theatre, 37, Russell Square, W.C.1, by Professor Theodore Madsen, M.D., Director of the State Serum Institute, Copenhagen, at 5 p.m., on Friday, December 1st, Monday, December 4th, and Tuesday, December 5th. The subjects of the lectures are: "Specific and unspecific antitoxin production," "Antitoxic treatment," and "The influence of temperature on antigen and antibodies." All interested are invited to attend.

A MEETING of the Harveian Society will be held at the Town Hall, Harrow Road, Paddington, on Thursday, November 16th, at 8.30 p.m., when Sir J. Thomson Walker will give an address on "Problems of prostatectomy," to be followed by a discussion in which Messrs. Cyril Nitch, Roche Lynch, A. Clifford Morson, J. H. Chaldecott, Montague Smith, and John Macevoy will take part.

AT the meeting of the Royal Microscopical Society at 20, Hanover Square, W.1, on Wednesday next, at 8 p.m., Dr. Charles Singer will read papers on the first mechanical microtome and on the first microscopical drawings.

DR. ANNETT and Mr. M. N. BOSE are engaged in experiments on poppy selection with a view to the production of medicinal opium of high quality. As the quantity of opium available from the few plants produced in such selection experiments is not large they have devised a method, which they reported to the meeting of the Society of Public Analysts on November 1st, for estimating the principal alkaloids in small quantities of opium.

THE Council of the Optical Society has decided to hold a conference and exhibition on ophthalmic optics, spectacle frames, and lens construction on Thursday, November 30th, at the Imperial College of Technology, South Kensington, London, S.W. The exhibition is not confined to those of British origin; it will consist of all apparatus, frames, and lenses connected with spectacle fitting and construction. It will be open from 2 to 7 p.m. From 4.30 to 10 p.m., with an interval, papers will be read on the above subjects by ophthalmic surgeons, physicists, and members of the industry. The president of the society is Sir Frank Dyson, F.R.S., Astronomer Royal.

TWO cases of rabies, one in a dog and the other in a cow, occurred in Holland during September, both in the province of Overijssel.

THE first meeting of the session of the Assurance Medical Society was held at 11, Chandos Street, W., on November 1st, when the president, Dr. R. A. Young, read a paper on the assessment of elderly lives for life assurance. The next meeting of the society will be held on January 3rd, 1923, when Dr. J. Strickland Goodall will speak on the significance of the extra systole.

THE French Government has offered a number of scholarships to Canadian universities, including the Universities of Toronto, Montreal, Laval, and Ottawa. The winner of a scholarship will spend the next academic year in France; the scholarship has a value of 6,000 francs, with an additional 1,000 francs for travelling expenses.

AT a meeting of the trustees of the Warren Triennial Prize at the Massachusetts General Hospital on October 13th it was decided that, owing to the difficulty of determining the relative merits of the first two papers, two prizes instead of one should be awarded this year, the first of 500 dollars and the second of 250 dollars; the second prize was not to be taken as establishing a precedent. The first prize was awarded for an essay on "The circulation in the mammalian bone marrow" by Dr. C. K. Drinker, Dr. Katherine M. Drinker, and Dr. C. C. Lund, of Boston, U.S.A. The second prize was awarded for an essay on "The effect of x rays on the nuclear division" by Dr. J. M. Mavor, of the Union College, Schenectady, New York.

THE thirty-first meeting of the Association of Military Surgeons of the United States was held in Washington on October 12th, under the presidency of Captain F. L. Pleadwell, U.S. Naval Medical Service. Major-General M. E. Ireland, Surgeon-General of the U.S. Army, and Rear-Admiral E. R. Stitt, Surgeon-General of the U.S. Navy, outlined the medical work of the army and navy of the United States. Representatives of the army and navy medical services of Britain, France, Spain, Japan, Peru, and the Argentine Republic were present as guests of honour; Surgeon Rear-Admiral C. M. Beadnell, R.N., and Colonel P. G. Goldsmith, of the R.A.M.C., were the British delegates.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediscera, Westrand, London*; telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone, 4361, Central).

QUERIES AND ANSWERS.

STIES.

"M. P." asks for hints in the treatment of persistent and recurrent sties on eyelids. He has tried calcium sulphide internally and disinfecting lotion without improvement.

URINE TESTS.

MR. W. H. MARTINDALE, Ph.D. (London) writes: In reply to Dr. Washington Isaac's inquiry (September 30th, p. 620) about the stoppers of bottles containing Fehling's solution becoming fixed and crystallized, the only satisfactory way to prevent this is to use a little soft paraffin on the stoppers. One could not advocate the use of glycerin in this instance. The same applies in the case of acetic acid and brine used for albumin testing. Another good plan is to employ rubber corks instead of glass stoppers. Furthermore, the amount of reagent required can easily be removed with the aid of a small pipette and teat without even touching the lips of the bottles.

INCOME TAX.

"A." sold one-half share in his practice to "B.," as from December 1st, 1921. For 1922–23 "A." has been charged on his average earnings over the three previous years and "B." on his earnings for the four months to April, 1922.

*** There should be one assessment only on the profits of the whole practice determined by the three years' average profits thereof. The duty chargeable on that assessment is divisible between the partners but payable by the firm. The division should be made by calculating each partner's tax as due on the gross assessment less his personal allowances.

"W. S. W." is a partner in a practice which, since 1914–15, has accounted for income tax on the basis of cash receipts, but the local inspector of taxes wishes to change to the basis of bookings.

*** We are of opinion that the inspector's request should be resisted—see a reply to "G. M." in our issue of November 4th (p. 898). The fact that the assessment was on the "bookings" basis in 1913–14 and 1914–15 may be due to special circumstances—for example, it may have been a new practice or may then have but recently changed hands.

"C. W. E." inquires as to the proper assessment of a practitioner entering a partnership.

*** Liability is determined by the share of the partnership assessment—on the three years' average basis. Bank interest can be treated as a professional expense, or alternatively repayment can be claimed on the amount of interest paid in the financial year. Instalments of the purchase price are capital payments, and no deduction can be claimed for them. This applies also to the purchase of the original equipment of instruments, books, etc., and to its improvement; any sums spent on maintaining and repairing the equipment can be claimed as a professional expense in determining the average profits.

"W. R. B." has a resident appointment in a Poor Law infirmary and is being taxed on his emoluments.

*** It was decided in 1892, in the case of Tennant *v.* Smith, that emoluments received in kind and not capable of conversion into money were not taxable—the case dealt with a bank

manager's privilege of rent-free residence. We know of no case specifically dealing with Poor Law emoluments, but it would be governed by the House of Lords' decision in the above-quoted case, unless the facts are essentially different—for example, if "W. R. B." was engaged at a salary subject to deductions for board, etc., supplied, he would be liable on the full salary and not on the balance paid over to him.

"A. N." has sold a side-car outfit and bought a Morris Cowley car.

*** The allowable expense is the amount that the replacement of the side-car outfit would have cost—that is, £140–£55=£85. "A. N." is apparently assessed for a public salary, under Schedule E, and not for general profits, under Schedule D; technically, therefore, he is not entitled to the allowance unless the replacement was "necessary" and "wholly" effected for the performance of the duties of his office.

LETTERS, NOTES, ETC

SWEATING IN PULMONARY TUBERCULOSIS.

DR. MARCUS PATERSON (Medical Superintendent, Colindale Hospital, Hendon) writes: Your correspondents will be interested to know that night sweats can easily be prevented without drugs by the use of a Japanese grass mat placed over the mattresses and under the sheet. Such mats are obtainable from Messrs. Mayer and Phelps, New Cavendish Street. An article going into great detail with regard to these slumber sweats was published by me last August in the *Lancet* on page 225. It is interesting to see that both your correspondents have noticed the effect of good hygienic conditions on night sweats—a matter to which I have referred in that article. Dr. Porter's method of waking the patients is a sure but unnecessary method of stopping the sweats. In the article mentioned it states that these sweats should be called "slumber" and not "night," as they may occur at any time when a patient goes to sleep. Waking the patient without even the whisky will surely stop the sweats! I do not agree with Dr. Pirie that there is any connexion between the heart and the sweats, except in so far as increased toxaemia may be the cause of the tachycardia. In that case, the tachycardia would be the result of the same condition as that which was producing the slumber sweats.

HERPES AND VARICELLA.

DR. WM. MCCALLIN (Southampton) writes: The following may be of interest to those who are on the look-out for cases bearing on the question of the connexion between chicken-pox and herpes. Sixteen days after the first appearance of chicken-pox in a boy aged 6 years, I saw his sister, aged 1 year and 9 months, who was supposed to have the same disease. The eruption consisted of numerous vesicles with the distribution of chicken-pox, and herpetic patches on the left side of the chest. It has taken the ordinary course of herpes. There have been neither chicken-pox vesicles nor fresh crops.

IS DESQUAMATION AFTER SCARLET FEVER INFECTIVE?

DR. JULES F. REY (Bognor) writes: Many years ago—about 1905—I remember reading of an experiment carried out in Germany where desquamating children from scarlet fever were washed with soap and water and the skin covered with sterile dressings for some days, then the desquamations were collected therefrom, and spread on bread-and-butter and given to children to eat, who had never had scarlet fever. None of them contracted the disease. Secretions from the body are the all-important sources during the first ten days; after this they only persist in chronic inflammations (such as naso-pharyngeal) and sores, however small or where situated. If the child after fourteen days has none of these he is no longer infective, and it is unnecessary to further segregate him. On the other hand, infectivity may be present for a year or more in chronic naso-pharyngitis or any discharge such as otorrhoea. There is recorded an instance where some children played with a skin foot cast (which came from a scarlet fever case ten or twelve years previously and was kept under a glass shade). They developed typical scarlatina a few days later—another evidence of the longevity of the virus in the dry state, for, no doubt, dried secretions were present upon the cast, for there is no mention of the foot having been washed beforehand. The way virulent dry secretions can be conveyed is truly remarkable.

PSYCHO-ANALYSIS.

DR. ARTHUR LYNCH (London, N.W.) writes: I propose to introduce into this discussion considerations which may seem as strange to your readers as those of Pasteur when he first astonished the medical men of Paris by neglecting to talk mediaeval nonsense and by proceeding to draw figures of organisms on a blackboard. Similarly what I now state will be subsequently so definitely accepted that future generations will wonder how scientific men could be content to speak in any other form on problems of mental analysis.

If we were to place ourselves in face of the whole world of thought, and if we proceeded by successive operations of analysis to reduce any kind of complex to its ultimate elements, we would find invariably as a result these—as I have called them—fundamental processes of the mind: (1) immediate presentation; (2) conception of unit; (3) memory; (4) association; (5) discrimination; (6) generalization; (7) feeling of effort; (8) impulse; (9) hedonic sense; (10) sense of negation; (11) conception of time; (12) conception of space. These fundamental processes are, as I have proved by methods of entire rigour, necessary and sufficient to cover the whole field. I may remark that it was the failure to obtain such a mode of demonstration that rendered the psychological systems of Aristotle and Kant defective, and the superstructure which they reared on that psychology, being vitiated by the basic error, became scientifically valueless.

The interplay of these fundamental processes constitutes the mode of action, or the mechanism, of all forms of thought. Has Freud shown any analysis of this sort? No. Proceeding from a remark of Charcot, whose own psychology was very inadequate, he catches on to one element—that of association; and then, bringing in a heterogeneous mass of observations, suppositions, obsessions, and silly reasonings, he builds up his system. It may be objected that I merely posit my fundamental processes here. Yes, but the complete demonstration will be found in *Psychology: A New System;* and hence I merely quote conclusions. In that book there is no allusion to Freud, but in my forthcoming *Principles of Psychology* I make that reference and overthrow the whole fabric of his nonsense. How? Simply by way of corollary in a footnote, by showing that it is inconsistent with the scientific principles I establish. Thus, for example, when the principle of conservation of energy is set forth it is laudable to reject every pretended invention that runs counter to it, and that indeed constitutes the only scientific form of criticism.

I will leave discussion of applications till later, only now saying that for years I carried on definite experiments in memory; Freud has nothing of the sort to show. The result is that his discussion of memory is worse than useless, it is misleading, while I have laid down—I speak again confidently for I have brought the matter here also to demonstration—certain basic laws. (Professor L. Dugas in a recent book, *La Mémoire et l'Oubli*, adopts my results as decisive.)

THE ACTING COMMANDING OFFICER DECIDES.

THE *Western Morning News* recently contained a rather amusing account of a court-martial, held at Devonport, to inquire into a charge of drunkenness against a naval officer. He had been reported to the acting commanding officer as having come aboard drunk. The commanding officer agreed with the diagnosis. The accused denied that he was drunk and urged that he was wilfully prevented from having the opportunity of calling medical evidence. The commanding officer in defending his action said that he had not sent for the medical officer because he had always understood that if the commanding officer of a ship said a man was drunk the medical officer could not reverse his decision. This is an amusing illustration of the view some executive officers take of the extent of their authority, but the point of the story is that the court-martial acquitted the accused.

THE ALVARENGA PRIZE.

THE College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, amounting to about 300 dollars, will be made on July 14th, 1923, provided that an essay deemed by the Committee of Award to be worthy of the prize shall have been offered. Essays may be upon any subject in medicine, but cannot have been published. They must be typewritten, and if written in a language other than English should be accompanied by an English translation, and must be received by the Secretary of the College, 19, South Twenty-second Street, Philadelphia, U.S.A., by May 1st, 1923. Each essay must be sent without signature, but marked with a motto and accompanied by a sealed envelope having on its outside the motto and within the name and address of the author. The successful essay or a copy of it must remain in possession of the College; other essays will be returned upon application.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 35, 38, 39, and 40 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 36 and 37.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *183*.

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Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.